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MIND

A QUARTERLY REVIEW

OF

PSYCHOLOGY AND PHILOSOPHY.

MIND

A QUARTERLY REVIEW

OF

PSYCHOLOGY AND PHILOSOPHY.

EDITED BY

Dr. G. F. STOUT,

WITH THE CO-OPERATION OF DR. E. CAIRD, PROFESSOR WARD, PROFESSOR PRINGLE-PATTERSON, PROFESSOR E. B. TITCHENER, AND OTHER MEMBERS OF AN ADVISORY COMMITTEE.

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PSYCHOLOGY AND PHILOSOPHY.

I.—HENRY SIDGWICK.

By Leslie Stephen.

I have undertaken after some hesitation the task of writing an obituary notice of Henry Sidgwick for this journal, which owes so much to him both as a contributor and, for many years, as a financial supporter. I could not now try, even if I held myself to be more competent than I am, to give any estimate of his work in philosophy. Readers of Mind have formed their own judgment in that matter. I am, however, qualified to say something of the man, partly because I was for many years honoured by his friendship; and more because I have been enabled to fill up the gaps in my own knowledge by the help of those who were in closer relations to him.[1] Though I hope that I did not wholly fail to appreciate Sidgwick during his lifetime, I can now see, not without regret, that I had scarcely recognised to the full the singular merits of one of the purest and loftiest natures of our generation. I think, too, that a clear appreciation of

[1] Mrs. Sidgwick has been so good as to give me information and has, in particular, allowed me to make use of a brief autobiographical fragment, written during his last illness, from which I have quoted some sentences. I have also to express my warm thanks to Mr. Arthur Sidgwick, to Dr. Jackson of Trinity College, to Dr. Venn of Caius, to Prof. Ward and to Prof. Maitland. Interesting notices by the Master of Christ's College (in the *Cambridge Review* for 25th October); by Sir F. Pollock (in the *Pilot* for 15th September); by Mr. Masternan (in the *Commonwealth* for October) have also been useful.

the man will throw some light upon the philosopher, though I must be content to indicate very briefly the general result.

Henry Sidgwick, born 31st May, 1838, was the third (and second surviving) son of the Rev. William Sidgwick. The father was the son of a cotton-spinner at Skipton, graduated at Cambridge in 1829, married Miss Mary Crofts and died as headmaster of Skipton Grammar School, 22nd May, 1841. Henry was sent to Rugby in September, 1852, after some time at a preparatory school. His mother took a house there in 1853. Sidgwick says that though 'successful in schoolwork' he had not been 'altogether happy' at the house where he had previously boarded, and he remained 'inobservant and bookish'. He was not of the Tom Brown type. The chief influence[1] upon him at this time was that of his second cousin, E. W. Benson, who afterwards married his sister and died as Archbishop of Canterbury. Benson became a master in the school in 1852 and had already helped Sidgwick in the study of Sophocles. Though not his tutor, Benson did much to stimulate Sidgwick's perception of the charm of classical literature, and by certain religious utterances 'startled' him into a reverential appreciation of the 'providential scheme of human history, which was not soon to be forgotten'. Sidgwick went to Trinity College, Cambridge, instead of standing in accordance with Rugby tradition for the Balliol Scholarship, because he knew Benson's affection for Trinity. His one ideal was to be a scholar as like his cousin as possible. For the present, Sidgwick was a thoughtful schoolboy of unusual precocity and the highest promise as a scholar. In 1855 he left Rugby as senior exhibitioner.

At Cambridge Sidgwick was probably the youngest man of his year. His career was a series of triumphs. He won a Bell Scholarship in 1856; the Craven Scholarship in 1857; the Greek Epigram in 1858; and graduated in 1859 as thirty-third wrangler and senior classic, winning also the first Chancellor's Medal. He was elected to a Trinity Scholarship in 1857, and in 1859 became fellow and assistant tutor of his college. The normal sequel to such achievements would have been a rise to the highest academical or ecclesiastical positions. He had, however, been led to a pursuit which promised no such tangible rewards. His autobiographical fragment was written to explain how a central aim had determined the course of his intellectual life even when it

[1] See Sidgwick's interesting reminiscences in the *Life of Benson*, vol. i., pp. 145-151 and 249-255.

seemed 'most erratic and fitful'. He fortunately wrote enough to explain how this aim was suggested to him and affected his first philosophical studies. In the first volume of this journal Sidgwick gave an account of the position of such studies at Cambridge. The indifference of an earlier generation had been finally broken up by the influence of Whewell. Whewell had lectured upon Moral Philosophy; he had introduced a paper upon philosophy into the fellowship examinations at Trinity, and he had procured the foundation of the Moral Sciences Tripos in 1851. A series of eminent lecturers at Trinity, Julius Hare, Thirlwall and Thompson, the last of whom had become Greek professor in 1853, had encouraged the study of Plato and Aristotle. The new tripos, however, had flagged, and was only admitted as a qualification for a degree in 1860. Sidgwick, absorbed in his studies for the old triposes, did not become a candidate; and he received no impulse from the official system. Cambridge, however, was to gain a philosopher by a kind of accident. In the beginning of his second year Sidgwick was invited to become an 'Apostle'. The invitation implied a high compliment from his ablest contemporaries. He fortunately accepted it after some hesitation in admitting a distraction from his regular studies. The effect was remarkable. The society has from the days of Tennyson and Maurice included a remarkable number of very eminent men. They preserved the tradition of the famous 'band of youthful friends' described in "In Memoriam". To discuss all topics with perfect frankness and with 'any amount of humorous sarcasm and playful banter' was the practice; and absolute candour the only duty enforced by the society. Any principle might be questioned, if questioned in sincerity; and Sidgwick observes characteristically that the apostles learnt to understand 'how much suggestion and instruction might be derived from what is in form a jest—even in dealing with the gravest matters'. 'The tie of attachment to the society formed,' he says, 'the strongest corporate bond which I have known in life.' It revealed to him that 'the deepest bent of his nature was towards' the life of thought—thought exercised 'upon the central problems of human life'. He could not, however, for many years take the study of philosophy for his principal task. He was a poor man and his first duty was to support himself. He accepted, therefore, a classical lectureship in October, 1859, and for the first two years after his degree allowed himself to be 'seduced into private tuition'. He read philosophy during his vacations and was especially

interested by J. S. Mill, then at the height of his remarkable influence. He had also looked at Comte 'through Mill's spectacles'.[1] He had not broken with the orthodox doctrine in which he had been educated, but had become sceptical as to many of its conclusions and especially as to the methods of proof. He and his friends were convinced of the need of a social reconstruction guided by scientific methods and of a religious reform founded upon an examination of the evidence for historical Christianity conducted 'with strict scientific impartiality'. His striking remarks upon Tennyson's "In Memoriam" explain his feeling.[2] He could never read the lines beginning 'If e'er when faith had fallen asleep' (in the 124th poem) without tears. "In Memoriam" had impressed upon him 'the ineffaceable and ineradicable conviction that humanity will not and cannot acquiesce in a godless world'. He could not find rest in agnosticism, and, though accepting the methods of modern science, revolted against its atheistic tendencies. Mill's philosophy offered no solution of the great difficulties. He oscillated for a time between religious and philosophical studies, while, 'as a matter of duty,' he also gave much thought to economic and social problems. In 1862 Renan's *Études d'histoire religieuse* suggested a new line of inquiry. Wearied with the indecisive results of the controversy between theologians and agnostics, he turned to the investigation of religious history. In the autumn of 1862 he spent five weeks at Dresden, devoting his whole time to the study of Arabic under a private tutor.[3] For the next three years his spare time was given to Arabic and Hebrew. He thought of aspiring to one of the two Arabic professorships at Cambridge. They had the advantage of being tenable by laymen, whereas the Knightbridge Professorship, which then expressly included Moral Theology, would probably be given to a clergyman. He gradually found that his Arabic studies would deduct too much time from the study of the fundamental problems. The comparative history of Semitic religions which he had planned, would, after all, not supply an answer to the great questions, whether the doctrine of the Incarnation could be accepted as historically true and what element of truth could be disengaged

[1] *Life of Benson*, ii., p. 249. Dr. Venn also tells me that for a time Sidgwick seemed to be much attracted by positivism.

Tennyson's Life, i., pp. 300-304.

[3] His friends speak of his having studied at Göttingen under Ewald, and of his ambition to become the 'English Ewald'. I follow Sidgwick's own account in his autobiographical fragment.

from the traditional creed. He turned again towards philosophy and worked hard to qualify himself as an examiner for the Moral Sciences Tripos in 1865 and 1866.

Dr. Venn informs me of another connexion which had some influence at this time. Venn had returned to Cambridge to lecture upon moral science; the only other lecturer in the same department was the Rev. J. B. Mayor of St. John's College, to whose influence upon Cambridge studies Sidgwick (in his article upon Cambridge philosophy) ascribes great weight. Venn, Mayor and Sidgwick, with a few later recruits, formed a society which was known to their friends as the Grote Club. They dined with John Grote, then Knightbridge professor, once a term at his vicarage at Trumpington, and afterwards read and discussed papers. Grote was a most efficient moderator, supplying a keen criticism and enforcing steady abstinence from digression. A certain affinity to his young friend is suggested by Sidgwick's remark that Grote's 'subtle and balanced criticism, varied and versatile sympathy, hardly qualified him—original as he was—to be founder of a school'. Croom Robertson notes[1] that Grote invented certain phrases, 'felicific' and 'hedonics,' of which Sidgwick afterwards made use. In any case, Sidgwick's philosophical studies must have been encouraged and his dialectical acuteness sharpened in his debates with these congenial friends. In later years, Sidgwick belonged to other societies of a similar kind, especially to the Metaphysical Society, in which he crossed swords with Huxley, Mivart, W. G. Ward, Dr. Martineau, and other champions of various causes; to the 'Eranus,' a Cambridge body on the same model, and to the later Synthetical Society. They gave a most appropriate arena for the display of his characteristic powers. His early associates of the 'Apostolic' circle were struck by the 'amazing maturity' of his intellect. Though one of the youngest, he was already among the most competent. He had thought out the problems sufficiently to see the bearing of the various arguments, and would select some apparently trifling point assumed by his opponent and by a Socratic method bring out unexpected consequences with which it was pregnant. Socrates became a bore by pressing similar discussions upon unwilling ears. But Sidgwick's friends had invited the discussion, and, if a momentary vexation might follow a fair fall in the wrestling, his entire freedom from arrogance or dogmatism left no excuse for irritation. If he could not produce agreement he always

[1] In his life of Grote in the *Dictionary of National Biography*.

promoted good-will. If, as has been said, the Metaphysical Society, died 'of love,' Sidgwick was one of the unintentional assassins. His readiness to argue implied, not the pugnacity which resents contradiction, but the desire to profit by it; and the sense of humour shown in his 'Apostolic' banter always played round his arguments. The foundation of another society about 1862 illustrates one of the qualities which added an extrinsic charm to his dialectical displays. His elder brother, Mr. William Sidgwick, was at this time a resident fellow at Oxford. The brothers founded the 'Ad Eundem' Society, which met alternately at Oxford and Cambridge for purely social purposes. Philosophising, if not forbidden, was certainly not compulsory. The society flourished, and Sidgwick attended a meeting within three months of his death. I had the honour of being an early member and, without offence to my comrades, I may safely say that the expectation of meeting Sidgwick was always one of the main inducements to attend; and that a pleasant bond which kept up old college associations and enabled representatives of the two universities to forgather on most agreeable terms owed much of its strength to the Sidgwick element. The charm of Sidgwick's society could be felt even by those who cared nothing for philosophy.

The 'Ad Eundem' illustrated another point. It included at starting such men as W. H. Thompson and W. G. Clark, then public orator, who had long been the ornaments of the upper sphere of academical society. Sidgwick, young as he was, was already admitted to the friendship of his most august seniors. In the following years, he gained the respect of the upper academical circles, especially of the more intellectually disposed, and his influence became potent among the younger dons. The first great changes in the university system had taken place during Sidgwick's undergraduate career. The proposal to abolish religious tests had afterwards come to the front: and to carry a bill for that purpose through Parliament was understood to be a necessary preliminary to further reforms. Sidgwick took an important, though necessarily a subordinate, part in the agitation. In Trinity he was one of a body of fellows led by J. L. Hammond, a man of singular charm who was prevented by ill health from making a mark proportioned to his great powers. In December, 1867, Sidgwick supported (and probably proposed) a resolution for abolishing the declaration imposed by the college statutes. It was rejected; but Sidgwick's later action had an indirect effect in securing the adoption of the policy. In June, 1869, he accepted a lectureship in Moral Philosophy

in exchange for the classical lectureship, and now made up his mind to attempt to found a philosophical school in Cambridge. Meanwhile, he was pressed by the question whether he had a moral right to retain his fellowship. The problem involved some delicate casuistry. He had qualified himself for the fellowship by a sincere declaration of belief. Could he hold it, now that he could no longer make the declaration? It might be urged that the legal measured the moral obligation and that, as no one had a right to inquire into his belief, he had a right to the position without regard to his present beliefs. He tried, he says, to settle the point 'on general principles'. But Sidgwick was pretty sure to be biassed by his own clear interests—that is, in the direction opposed to them. Anyhow, he resigned his fellowship in October, 1869. Sir George Young, a most competent witness, says in the *Cambridge Review* that the effect of his resignation was very great. Fellows of other colleges followed his example. An important meeting, held at Cambridge in December, showed that a majority of residents was in favour of the abolition; and a similar meeting at Oxford two days before had been suggested by a knowledge of the intended meeting at Cambridge. The parliamentary action followed which led to the final abolition of tests in June, 1871. How far Sidgwick's action had all the influence ascribed to it can hardly be decided. Sidgwick would have been the first to condemn any exaggeration of his own part. I must therefore note that the parliamentary proceedings had shown clearly that the main obstacle to a liberal success was the abnormal slowness of the process of converting Gladstone upon such questions, and that a more popular argument was the disqualification for fellowships of the senior wrangles of 1860, '61 and '69. But there can be no doubt of the great moral significance of Sidgwick's action. He was giving up for a scruple, which to most people seemed refined, his chief support and as it seemed the chances of academical position. Happily by that time, the fellows of Trinity were singularly free from any theological bigotry. Sidgwick was permitted to retain his position as lecturer with the social privileges of a fellow.

Sidgwick now began the course of teaching which continued through his life. In October, 1875, he became Prælector on Moral and Political Philosophy in Trinity; and in 1883 was elected to the Knightbridge Professorship upon the death of Prof. Birks. He had been a candidate for the post in 1872, when Birks succeeded F. D. Maurice. He had not then published his great book. In 1883 his fitness

was so obvious that the election might be almost said to be by acclamation.

Sidgwick's influence as a lecturer was both important and characteristic in kind. The position of the study at Cambridge was so far unfavourable that his classes were necessarily very small. Sidgwick himself expressed some doubt as to the utility of metaphysical studies for men at the early age of his hearers. A youth, not endowed with a special predisposition, is more apt, he might think, to learn a philosophical jargon than to gain a clear insight into the real issues. This view prevented him at a later period, according to some of his colleagues, from pressing the claims of his own faculty so vigorously as they thought desirable. His own example, however, proves sufficiently that an aptitude for such study may show itself early and be well worth cultivation. I lately heard an intelligent person inquire what was the meaning of 'ethics'. Some explanation being offered, the inquiry arose how it could be possible to devote volumes to setting forth the objections to breaking the ten commandments. For practical purposes, perhaps, the state of that person was the more gracious; but Sidgwick's *Methods of Ethics*, of which his lectures were now giving the substance, would have answered the question effectually. To the select few his speculations revealed whole fields of interesting speculation. Sidgwick, of course, could hardly found a school in the ordinary sense. A 'Sidgwickian,' as connoting acceptance of a definite philosophical platform, would be almost a contradiction in terms. At anyrate where there were two Sidgwickians, they would necessarily resolve themselves into a debating society. Sidgwick had not the attraction of the teacher who has attained definite results and can give the watchword to a band of enthusiasts. His influence was free from the defects, if it had not the characteristic merits of such a position. It did not lead to ignoring difficulties but to facing them fairly. Though not claiming to have solved the great problems, he was fully convinced both that they were soluble, and that a man might well devote his life to hastening the solution. His subtlety in seeing difficulties and his candour in admitting them did not lead to a mere play of skilful dialectics. He set his hearers' minds to work and to work in the interest of truth. Several of his hearers have turned his lessons to good account; and have acknowledged most emphatically the debt which they owe to him. Close contact with such a man was no small part of 'a liberal education'. For Sidgwick had the ethical genius; and was as sensitive to the moral as some men to

the æsthetic aspects of life. His transparent simplicity, extraordinary alertness of mind and intense love of truth enabled him to preach by the effectual method of personal contagion.

Meanwhile he had already taken up a function which absorbed much of his energy and fully illustrates his moral enthusiasm. Devotion to philosophy would not, he held, justify abstinence from the active duties of life. He desired to do something for the good of mankind and was naturally led to promote the education of women.[1] Girls had been admitted to the Cambridge examinations; and in the autumn of 1869 Sidgwick thought out and proposed a scheme for providing lectures for the candidates. It was warmly taken up, and its success suggested the advantage of providing a house for the students in Cambridge. Sidgwick made himself responsible for the rent of such a house and in 1871 invited Miss Clough to undertake the superintendence. This again led to the formation of a company in 1874, to which Sidgwick subscribed money as well as labour; and to the opening of Newnham Hall, built by the company in 1876. In that year Sidgwick married Miss Balfour. It would be as impertinent as happily it would be superfluous for me to speak of that event in any other way; but its bearing upon this part of his career is matter of public knowledge. When in 1880 the North Hall was added to Newnham, Mrs. Sidgwick became vice-president, and the Sidgwicks took up their residence there till her resignation two years later. Sidgwick was a main supporter of the important measure by which, in 1881, women were admitted to the honours examination, and a great stimulus given to the movement. Upon Miss Clough's death, in 1892, Mrs. Sidgwick succeeded to her post, and the Sidgwicks resided in the college during the remainder of his life. Throughout the whole of this period Sidgwick, who had been the chief founder of the organisation, was at the heart of the resulting movement: suggesting the schemes which ultimately succeeded, advising Miss Clough through all her difficulties, taking the keenest interest in all the details of management, winning the affection of teachers and students by his social charm and judicious counsels, contributing munificently in money and taking the lead in the university legislation which was required by the novel experiment. He was always a member of the Council of Newnham, and was also for some years connected with the college at Girton. The main difference between the two

[1] I refer to the life of Miss Clough for full details.

bodies was that Sidgwick and the supporters of Newnham were less anxious than their friendly rivals to assimilate the education of women precisely to the system established for men. For Sidgwick may be claimed, without hesitation, a leading part in the remarkable changes which have transformed the whole theory and practice of the higher education of women in England.

Another set of duties fell to him in later years. The University Commission of 1877 had been appointed in consequence of proposals by Cambridge Liberals which Sidgwick helped to formulate. Not being a member of the governing body, he had no direct share in the changes made at Trinity College under the Commission. The new statutes for the university came into force in 1882. Sidgwick's value was by this time fully appreciated in the university; and in November, 1882, he became a member of the General Board of Studies created under the new system. He held this position till the end of 1899 and acted for several years as secretary. He was also a member of the Council of the Senate from 1890 to 1898. His colleagues on both speak emphatically of his conscientious discharge of his duties; his skill in debate and his power of incisive criticism tempered by unfailing courtesy. The Cambridge system went through very important changes, in which he played his part. I am not qualified, nor would it be here possible, to deal with questions of university politics; but one or two points, which I learn from Dr. Jackson, are characteristic. The new order of things raised some delicate questions. The taxation of the colleges for university purposes was made burdensome by agricultural depression. Sidgwick, with two colleagues, was appointed by the General Board to investigate the necessary rearrangement. He took the whole work upon himself: collected all the information and devised an elaborate scheme for settling the difficulty. He threw himself heartily into financial problems and Dr. Jackson thinks that he would have liked nothing better than to be Chancellor of the Exchequer. He would have 'devised an amazingly ingenious budget and his exposition would have been a marvel of lucidity and address'. His scheme failed of acceptance by an appearance of over subtlety, and Dr. Peile admits that, if ever a doctrinaire, he was so on the General Board. He delighted in framing schemes for compromise, and became at times too obstinate in adhering to his own compromise. He had allowed so carefully for all interests that any other arrangement seemed to him unjust. He was, it is also suggested, so much interested in the details as occasion-

ally to lose sight of the broader and more obvious issues. No one, however, doubted the great value of his energetic co-operation in a period of important changes. When he indicated by giving up his place on the General Board that he was probably abandoning administrative work, says Dr. Jackson, the news seemed 'almost tragic'. It was 'like the parting of a parent and child'. One most tangible proof may be given of Sidgwick's keen interest in the reforms. The university was enabled by his munificence to introduce, or to hasten the introduction, of various additions to its agencies. He supplied the funds by which Dr. Maitland, now Professor, was restored to the university as reader in law; he helped in the same way to start the professorship now held by Dr. Ward, and he enabled the university to build a museum required by the School of Natural Sciences.

Sidgwick's final retirement from the Council was partly connected with the last phase of the question of admitting women to degrees. He never wished to adopt the university system of education for women without modification, and objected in particular to 'compulsory Greek'. He supported the proposal to grant titular degrees to women, though he had at first thought it premature or imprudent. Opponents thought that it was a step which would necessarily lead to further changes; Sidgwick and his friends considered it as a compromise for an indefinite time, though they could not pledge themselves to its absolute finality. The rejection by a great majority was a blow to the party of advance. Nobody could ever suspect Sidgwick of the slightest insincerity; but the measure advocated might seem equivocal, however good the motive: and a love of compromise, though prompted by simple desire for justice, may have an appearance of diplomacy.

Sidgwick's influence was for the moment injured; but he had other motives for not again standing for election to the Council. He was anxious to finish literary work, of which it is only strange that he had performed so much under so many distractions. Besides the duties already noticed he had from a very early time (certainly from 1864) taken an interest in 'Psychical Research'. The interest was connected with his course of speculation. His ethical position led him to desire some 'direct proof of continued individual existence'. He was president of the society founded in 1882 from 1882-1885, and again, 1888-1893; and for some time edited or superintended the editing of its journal. He brought to it all the conscientious spirit of scientific investigation; and a desire to discover the truth of

alleged facts led him to investigate them with the most rigid impartiality. He was not the man to accept Don Quixote's method of testing his armour leniently when he wished it to be trustworthy. He fully recognised and helped to expose the impostures which obscured any real substratum of truth. Yet another application of his energy is mentioned in the organ of the Charity Organisation Society. He was one of the founders of the Cambridge branch in 1879, having previously belonged to the Mendicity Society. He drew up its rules, presided over the weekly meetings for many years, contributed liberally, and was president till his death. 'It will never be fully known,' it is added, 'how much of all that is best in Cambridge to-day was due to his inspiration and example.'

Sidgwick had found time in the midst of these labours to produce his three books, the *Methods of Ethics* in 1874; the *Principles of Political Economy* in 1883; and the *Elements of Politics* in 1891. He has also left work still in manuscript, a considerable part of which will, it is hoped, be published. The amount and quality of the purely intellectual work is the more remarkable considering his activity in practical directions. I have tried, however, to indicate in how many ways Sidgwick's employments fitted in with his pursuit of philosophical truth. A moralist is none the worse for some practical acquaintance with applied morality. His other work gave weight to his convictions if it limited his output within a moderate compass. Indeed, considering the temptations of so versatile an intellect to excessive discursiveness, his other occupations may well have suppressed only corollaries which though interesting would be, in strictness, superfluous.

Sidgwick had hoped that after reaching sixty he might resign his professorship to some worthy successor and devote himself to finishing his literary work. The warning that he was suffering from a dangerous disease came to him early in 1900, and was accepted with the most admirable courage and simplicity. He afterwards read a paper at the Synthetic Society and took part in the debate with his usual brilliancy. Friends who met him still later, without being aware of his position, found the old charm in his conversation and were only impressed by a rather more marked tone of friendly interest. He resigned his professorship; quietly wound up his affairs; and parted from life as nobly as he had lived it. He died on 28th August, 1900.

A word or two upon personal characteristics may be permitted. Sidgwick had no great physical power. He suffered

a good deal from hay fever, and in late years from insomnia. He soothed hours of wakefulness by reading a great quantity of novels, and remembered their plots with singular retentiveness. Dr. Peile records that when meditating he liked to take a sharp walk, often 'breaking into a little run'. The starts indicated, perhaps, the flashing of some new thought upon his mind. The vivacity of such impressions made him one of the best of talkers. The difficulty of describing conversation is proverbial, and when I seek for appropriate epithets I am discouraged by the vagueness which makes them equally applicable to others. Henry Smith, for example, who often met Sidgwick at the 'Ad Eundem,' had an equal fame for good sayings; and both might be credited with unfailing urbanity, humour, quickness and other such qualities. Their styles were nevertheless entirely different, while to point out the exact nature of the difference is beyond my powers. Smith, perhaps, excelled especially in the art of concealing a keen epigram in a voice and manner of almost excessive gentleness. Sidgwick rather startled one by sudden and unexpected combinations and arch inversions of commonplace. His skill in using his stammer was often noticed. His hearers watched and waited for the coming thought which then exploded the more effectually. Sidgwick not only conceded but eagerly promoted contributions of talk from his companions. He would wait with slightly parted lips for an answer to some inquiry, showing a keen interest which encouraged your expectation that you were about to say a good thing, and sometimes, let us hope, helped to realise the expectation. He differed from Smith—who preserved a strict reticence upon the final problems—by a readiness to discuss any question whatever, if it were welcome to his companions. He was not only perfectly frank but glad to gain enlightenment even from comparatively commonplace minds. Johnson commended a talker who would fairly put his mind to yours. That marks one of Sidgwick's merits. He would take up any topic; made no pretension to superiority, and was as willing to admit ignorance or error as he was always fertile in new lights. He delighted in purely literary talk; and his criticisms happily combined two often inconsistent qualities: the freshness of impression which suggests a first reading of some book, with the ripeness of judgment which implies familiarity with the book and its writer. He might, I think, have been the first of contemporary critics had he not devoted his powers to better things. Sidgwick could not be unconscious of his own abilities; but was as free from arrogance as from any approach to ostentation; and, in

fact, freedom from the weaknesses of morbid self-consciousness was one of his most obvious characteristics. When he resigned his fellowship, he made no fuss about doing a simple act of duty; and when the fatal sentence was pronounced, he accepted it with perfect quietness, without complaint, and with no display of resignation. There was no merit in Boswell's good humour, said Burke, it was so natural. I had the same feeling about Sidgwick's unselfishness and high principle. I fancied that he could not really have a conscience —much as he professed to esteem that faculty—because I could not see that his conscience could ever have anything to do. He had plenty of scruples, because he saw the full complexity of any special case; but, when he had the facts properly arranged, the decision to act followed spontaneously.

I must try to indicate in a few words the relation between Sidgwick's thought and his personal characteristics. I may take for granted the singular activity and subtlety of his intellect. The whole substance of his books is logic, with a minimum of amplification or rhetoric. They are a continuous and unflagging scrutiny of the positions to be established or confuted. The subtlety again is always at the service of common sense. It is directed to secure clearness and solidity, not the construction of an elaborate system. I remember his once speaking of certain philosophies. They resemble cardhouses: you can perhaps coax your first principle into an appearance of stable equilibrium; but when you build a second upon the first and go on to a third and fourth, the collapse of the whole edifice is certain. It was therefore Sidgwick's aim to lay secure foundations on solid ground. He has given in a fragment (to be published in a forthcoming edition) a 'genetic account' of his book upon ethics. He had been repelled by Whewell's arbitrary system of intuitions, and attracted by the plain common sense of Mill's Utilitarianism. But difficulties revealed themselves which sent him to all the great moralists from Aristotle to Butler and Kant. The final result seemed to some of his critics to be a rehabilitation of Utilitarianism. He protested against this view and said that he had criticised Utilitarianism as unsparingly as Intuitionism. He had 'transcended' the difference; or (as he says in the fragment) become a Utilitarian on an Intuitionist basis. The first principle of Utilitarianism is 'the most certain and comprehensive of Intuitions'. But the reconciliation itself brings out most sharply a fundamental contrast—that, namely, between this first principle and the conflicting principle of 'rational

egoism'. It is 'reasonable' to seek our own happiness; and yet it cannot be proved empirically that this harmonises with the other reasonable principle of seeking the general happiness. Conduct, then, cannot be made 'intrinsically reasonable' without accepting a hypothesis 'unverifiable by experience'. Unless, therefore, we can believe that the moral order imperfectly realised in this world is actually perfect, the 'cosmos of duty is really reduced to a chaos' and the attempt to form a perfect ideal of rational conduct foredoomed to inevitable failure. Sidgwick, that is, had not found a final solution for the old Utilitarian difficulty. A sufficient criterion of morality could be found in the 'greatest happiness' principle; but the difficulty was to discover a sufficient 'sanction'. How much this difficulty affected Sidgwick is shown by his remarks upon "In Memoriam". He frankly admitted that he could not give a solution. Meanwhile, whatever the true answer, the effect of his elaborate scrutiny into the fundamental conceptions of Ethics gave, as I think from my own experience and that of others, the most important of all modern contributions towards a clear realisation of the conditions of approaching the problems involved.

A similar tendency marks his *Political Economy*. His early interest in social problems had led him to the subject. His love of all intellectual activities took him far into some technical discussions, upon bimetallism for example, which have little bearing upon ethics. But his main point is closely connected with the problem of what Bentham called 'self-regarding conduct'. He had been again greatly influenced by Mill. He adopts old methods, but endeavours to restate the results so as to meet later criticisms. The 'classical economists' had insisted upon the supreme importance of self-interest and had deduced the *laissez faire* doctrine. Sidgwick by a careful and acute investigation of their arguments tries to recognise the true place of the 'self-interest' principle, and to get rid of the excessive absolutism of his predecessors. He refutes in particular, the 'wage fund' theory, which had been used as an argument against the possibility of social improvement. The old rigid system is thus broken down, and free play is left for hopes of social regeneration. It is, however, equally characteristic that Sidgwick endeavours to do full justice to the importance of the self-interest principle, which had been unduly magnified into the sole axiom of political economy; and, without adopting the old *non possumus*, emphasises the necessity of appealing to experience. He

is characteristically opposed[1] to the claims of sociologists, who have jumped prematurely to general theories of society which would invalidate or absorb political economy; and to such followers of the historical school as incline to deny the possibility of anything beyond purely empirical results. Sidgwick's mixture of cautious scrutiny with a hearty respect for the common sense embodied in the old system is again conspicuous.

Both in the *Ethics* and the *Political Economy*, his common sense leads him to assign less importance than many of his contemporaries to evolutionist theories. They tend, he clearly holds, to exaggerated claims of scientific infallibility and after all leave the fundamental questions to be answered. If you could show how morality has come into being, you would not show what it actually is. The effect of his position is marked in the *Elements of Politics*. He was always keenly interested in political questions and showed his characteristic common sense in speaking of them. There is abundance of that quality in the *Politics*, when he again expressly takes up the line of Bentham and his followers. We have the old problem of the proper relation between the State and the Individual, or self-interest and public spirit. Common sense is invaluable; but I confess that to my mind it is impossible to discuss political questions effectively without constant reference to historical development; and that, from the absence of such reference, Sidgwick's book is rather a collection of judicious remarks than a decided help to the formation of political theory. He afterwards, I believe from a sense of this weakness in his method, took up some historical investigations into political institutions and delivered lectures upon the topic. I do not know whether they were sufficiently finished to justify republication, or how they might be related to the general treatise.

Sidgwick published nothing, I think, expressly treating of the ultimate problems which always occupied his mind. Friends have told me that in later life he drew rather nearer to orthodox views. The Synthetic Society, of which he was an important member, endeavours, I understand, to promote efforts towards a reconstructive process with which he no doubt strongly sympathised. He perhaps felt that he had no definite help to give to the solution of the final difficulty suggested in the conclusion of the *Ethics*, or hoped that he might be able to utter his convictions more fully when he

[1] See his "Scope and Method of Economic Science" (address to the British Association, 1885).

was relieved from the pressure of his active employments; and could complete his speculative labours, if not by offering a full answer to his doubts, yet by indicating the best method of approximating to such a result.

A meeting of Sidgwick's friends was held at Cambridge upon the 26th November. It was resolved to raise funds for some memorial; but it is not yet decided whether it should be a library of philosophical books, a studentship in philosophy or a lectureship in moral science.

II.—THE PHILOSOPHY OF T. H. GREEN.[1]

By the late H. Sidgwick.

It is said that an undergraduate once, being asked in examination to describe the economic conditions of the inhabitants of the Hebrides, stated that they "earn a precarious livelihood by washing one another's clothes". It has often seemed to me that if, after Carlyle, we take "clothes" symbolically, to denote the outward and verbal vesture of the inner life of thought—and if we add that the process of washing is sometimes performed with a disintegrative roughness which no laundress would think of applying to the delicate texture of material clothes—the phrase would aptly describe a considerable part of the industry of modern metaphysicians. I have begun with this simile to show you what I wish to avoid in the present paper: my sincere aim is to get at the real inner essence of Green's thought, and explain why it does not satisfy me: but I feel sure that I shall at best very partially succeed: and that much of what I say will appear to any disciple present to be at the most mere washing of clothes—mere indication of casual inadvertencies or inadequacies of expression—if indeed he will admit even that.

With the aim that I have described, I think that I had better begin with a brief characterisation of Green's Philosophy, as I conceive it. But here I have a certain obstacle to overcome: respect for the wishes of an old friend. For Green not only disliked being "labelled" generally—I suppose most of us do that, yet we know that labelling must go on—but he particularly objected to *my* labels for him in old

[1] A lecture to the Oxford Philosophical Society delivered 21st May, 1900—the last that Prof. Sidgwick gave. On his MS. is the following note: "For the necessary limitation of the subject, I have confined myself mainly to the *metaphysical* view expounded in Green's latest work—*Prolegomena to Ethics*—as distinguished from the ethical doctrine put forward in the same work, which I reviewed in Mind at the time of its appearance". See Mind for 1884, vol. ix., pp. 159-187. The lecture is here reprinted from his unrevised MS. as he left it.—J. W.

days. I called him a 'Transcendentalist' and I called him a 'Hegelian': and he objected to both. Accordingly, I shall to-day use neither term: but I may perhaps say that while I now admit his objection entirely as regards the latter of the two labels, I still think it overstrained as regards the former. That is, I do not see why a philosophical system so closely filiated to Kant's should repudiate the master's own designation, 'Transcendental'. But 'Hegelian' is a term that I should never have applied to the author of the *Prolegomena to Ethics*, and it is with this latest expression of his thought that I am now concerned. I think indeed that the term might be defended in relation to some of his earlier utterances; and that his thought during his life moved away from Hegel. May I give two personal reminiscences that confirm this. I remember writing to him after a visit to Berlin in 1870, and expressing a desire to "get away from Hegel": he replied that it seemed to him one might as well try to "get away from thought itself". I remember, on the other hand, that in the last philosophical talk I had with him, he said, "I looked into Hegel the other day, and found it a strange *Wirrwarr*":—the sentence startled me; and the unexpected German word for 'chaos' or 'muddle' fixed it firmly in my mind.

However that may be, I reject to-day both these old labels. The terms I now propose are 'Idealistic' and 'Spiritualistic': and, in explaining why and how I use the two, I shall at the same time indicate my most fundamental difficulty in assimilating Green's metaphysic. In brief—his Spiritualistic conclusions do not seem to me to cohere with the Idealistic premisses on which they are based. I employ the two terms, in the hope of getting rid of the variation and ambiguity in the use of 'Idealism' which in current English thought appears to me to have become quite intolerable. The definition of Idealism seemed to Kant a simple matter: it "consisted in the assertion that there are none but thinking beings, all else being merely representations in the thinking beings": that is, it analysed reality into the "spirits and ideas" of Berkeley. This doctrine I now propose to call 'Spiritualism': defining it by the characteristic that it makes a fundamental distinction between the Spirit or Subject—whether human or primal and Eternal—and its ideas, thoughts, or thinking activities. The relation between the Spirit and its thoughts or activities may be very variously conceived: the important point for my definition is that the distinction between the two should be fundamental: and such a fundamental distinction seems to me quite explicit in Green's

doctrine as well as in Berkeley's, and is implied in Kant's definition above quoted. But owing, as we know, to the development of Kant's philosophy by later thinkers, another metaphysical view has become current, which simplifies the conception of reality by suppressing or subordinating the distinction between the thinker and his thought, and simply represents the Universe as essentially Thought or Thinking Activity. This view, and this alone, I label Idealism.

But there are other views currently called Idealism, especially in English philosophical discussion, which it will be convenient to label before I concentrate attention on Green. *E.g.*, it may be held broadly that "matter in ultimate analysis is a mode of mind or consciousness," without raising the question of a conscious self or subject, or entering on the distinctions and relations between different kinds of consciousness—such as thoughts, feelings and volitions. Such view I think is often called Idealism. I propose to label it 'Mentalism' in broad antithesis to 'Materialism'. If, again, the Mentalist's ontology expressly excludes the notion of self or subject;—if, following Hume, "when he enters most intimately into what he calls himself," he fails to find any self to observe; and therefore "ventures to affirm of mankind 'in general' that they are nothing but bundles or collections of different perceptions, which succeed each other with an inconceivable rapidity"—then perhaps we may designate him as an atomistic Mentalist. But if a single word is desired, we have, I think, to take note of different results of the philosophic effort to simplify the empirical diversity of transient mental facts or states of consciousness. If—again following Hume—it is held that "all our simple ideas are in their first appearance derived from simple impressions," and that among impressions the sensations are "original" and the passions and other emotions secondary and derivative—one may properly call the doctrine Sensationalism. If on the other hand Will is viewed, as by some German thinkers of the day, as the most fundamental or essential fact of Mind, and also the "inner side" of matter, I would offer the label Volitionism. If thought or "thinking activity" is so regarded, we are brought back to Idealism in my sense. Only as to these latter terms it must be borne in mind that Volitionism in German thought is not in its origin (in Schopenhauer) atomistic, nor ever completely so in later thinkers: while Idealism, I think has never been Atomistic; it has always viewed reality as a coherent system of thought, or an essentially single and only partially self-differentiating activity of thought.

Well, this is the labelling I propose: let me briefly sum it up.

Mentalism = 'Reality is mental' (or 'matter in ultimate analysis, consciousness') subdivides into
Idealism = "Reality is thought" or "thinking activity".
Volitionism = "Reality is Will or Volition".
Sensationalism = The ultimate elements of reality are Sensations or "feelings" (in older wider English sense).

And—distinct from each and all of these three—
Spiritualism = "Reality is conscious" = thinking, willing, feeling beings
(for Spiritualism again may be Idealistic, Volitionistic, or Sensationistic, or predominantly the one or the other).

I ought to add that of these different species of Mentalism, Sensationalism at least is sometimes held as a theory not of "Reality" unqualified, but of *knowable* reality: or is even definitely combined with *Agnosticism* as regards Reality. So held it might perhaps be labelled Phenomenalism. Finally let it be understood that I do not profess to range all the subtle diversities of modern metaphysical belief under these briefly and sharply defined headings: they are, I admit, more adapted to denote predominant *tendencies* in living and actual metaphysical systems, than to characterise precisely the systems themselves.

I can now, I hope, state both briefly and clearly my view of Green's Metaphysical System. First, it is a species of Mentalism. Nature, or the world of space and time, is conceived as a single, unalterable, all-inclusive system of relations: and these relations are thought-relations; they result from the activity of thought. So again, so far as this conception of Nature goes, the system is clearly the species I have called Idealism. If Nature is essentially a system of thought-relations, Reality is—so far—Thought. And if Thought was conceived as simply *für sich bestehend*[1]—as Green had conceived it some years before—the whole system might have been purely Idealistic. Thought would then not only have made Nature, but have completed itself—its system of relating and related notions—in Spirit: so that the Universe of Reality would have been truly thought as Thought itself.

But this is not Green's view in the *Prolegomena*: on the contrary, it is a view that he decidedly and emphatically excludes. The single all-inclusive system of thought-rela-

[1] *Cf. Works*, vol. ii., p. 11 note.

tions which constitutes nature, "implies something other than itself, as a condition of its being what it is".[1] It presupposes the activity of a thinking being, a "self-distinguishing, self-objectifying, unifying, combining consciousness" whose synthetic activity is the source of the relations by which the knowable world is unified: and we are entitled to say of this entity, that the relations which result from its synthetic action are not predicable of it. "They arise out of its presence to phenomena, or the presence of phenomena to it, but the very condition of their thus arising is that the unifying consciousness which constitutes them should not be one of the objects so related." This consciousness is therefore "not in time, not in space," etc., not "above or beyond or before nature," nor a "substance of which the changing modes constitute nature," nor "a cause of which nature is the effect": and "causation, indeed"—we are told—"has no meaning except as an unalterable connexion between changes in the world of experience". The most distinctive term for it—as "consciousness" and "mind" have wider meanings—is Spirit.

Briefly, then, a spirit's thinking activity is the source of a system of notions, by which the world is constituted, but it cannot itself be thought under any of these. It is the former proposition that leads me to call Green's view Idealistic: it is the latter which leads me to call it Spiritualistic, according to the definition before given.

For it is not only the Divine Spirit, that constitutes the world, which is affirmed incapable of being itself conditioned by any of the relations that result from its combining and unifying action: this is no less true of human minds so far as they have knowledge, and understand the world, to however partial and limited an extent. Indeed, finite minds are not merely similar in this respect to God, and analogously active—in unifying and combining—each within the limits of his own experience: this likeness, this analogy of action is, in Green's view, an adequate ground for inferring *identity*, between God and finite minds, so far as the latter are not merely sentient but intelligent. 'Man' is for Green, as for common sense, a composite or dual being: but the duality seems to be different. For modern Common Sense—at least—man is composed of Mind and matter, and feelings no less than thoughts—as contrasted with cerebral nerve-processes—are regarded as mental facts. For Green, on the other hand, sentiency, and even consciousness in a certain

[1] *Prolegomena*, § 52 f.

sense, belongs to the nature constituted by thought-relations: but so far as knowing, each man's consciousness is nothing but the eternal consciousness itself, reproducing or realising itself in a limited form in connexion with the man's animal organism which it makes its vehicle, and whose sentient life it uses as its organ. It is as such a reproduction or realisation of the one Divine Mind that a man is also a "self-distinguishing, self-objectifying consciousness," a "self-conscious personality" or briefly a "spirit".

"Realise or reproduce." The alternatives are rather startling: so vast an issue appears to be left an open question by the disjunction thus quietly suggested. For if we say "realise," God and his complete knowledge, and Nature, the single all-inclusive system of relations appear to lapse into potential existence; reality being restricted to finite spirits and their partial and imperfectly understood experiences. We should thus get an Idealism curiously correspondent to the sensationalism of J. S. Mill; possibilities of thought taking the place of the latter's possibilities of sensation. Can we infer from the alternative phrase that Green recognised this or something like this as a tenable metaphysical position? I cannot say: but one who has read the *Prolegomena* through can hardly doubt that he decisively adopted the other alternative. The conception of One Divine Eternal Spirit, who really *is* all that the human spirit is capable of becoming, is essential to his ethics: God is the ideal of the human spirit, but he is an ideal completely realised.

This then is Green's 'Spiritualism' as distinguished from his Idealism. There is, of course, an essential connexion between the two: my point is that there is also, in a certain sense, an essential opposition. The Spirit makes nature: but it is and must be a non-natural principle. That is it constitutes nature by a system of relations which result from its action as thinking: but for that very reason these thought-relations "are not relations of it, not relations by which it is itself determined". For, once admit it to be otherwise, once suppose that any of the thought-relations resulting from its thinking activity are applicable to it, then it becomes *pro tanto* a part of nature: its non-naturalness can no longer be maintained, and the *pivotal* notion of the whole system is removed.

We come, then, to the questions which I primarily offer for discussion this evening. Is this combination of Idealism and Spiritualism — as I have distinguished them — really thinkable? and does Green really succeed in thinking it? I am compelled to answer both questions in the negative,

but I shall devote my own discussion chiefly to the second question.

Let us first take Green's positive account of Spirit, and ask, point by point, whether we can definitely think the qualities or functions he attributes to it, without in so thinking, predicating of it some of the relations which—according to Green—result from its combining and unifying activity, and are therefore not properly predicable of it.

First he conceives it as *one* and *many*: one Divine Mind and many reproductions of it; here we have relations of number.

Secondly the human spirit is identical with the Divine:—the latter is said to be a "spirit which we ourselves are": yet again it is a "reproduction" of it and a reproduction is different from the original. Here we have a peculiar and difficult combination of the relations of identity and difference.

Again, a Spirit is a "self-distinguishing" consciousness: that means, I suppose, that it attributes to itself unity, identity, difference from nature and, I suppose, from other spirits. But again it is a "self-objectifying" consciousness: that is, it conceives itself as an object: and therefore in a relation of similarity with nature, so far as both spirit and nature must be thought as having whatever attributes are connoted by the word "object". Finally, it is a 'unifying' and 'combining' consciousness: but by each of these terms its function is conceived in a relation of similarity to processes that we conceive as occurring in Nature: Nature is continually presenting to us combinations and unifications, as well as separations and divisions.

In short, taking Green's descriptive terms, and endeavouring to think by means of them, we find that we are inevitably conceiving Spirit as conditioned or determined by the very same relations that we use in determining phenomena.

Turn now to the negative characterisation that he gives of Spirit, to emphasise and impress on us its non-naturalness. It is, he says, not in time, not in space, not a substance, not a cause. But can he really think it thus? Let us see.

First the Spirit is "not in Time". If so, we are to understand not merely that it does not change but that it does not perdure; since changing and perduring are equally time-determinations. Hence when Green speaks of the Divine Spirit as "eternal," we must understand him to intend to mean not "everlasting," but merely the same as when he speaks of it as "not in time". But can we conceive this to be his meaning when he speaks of it as

"a consciousness for which the relations of fact that form the object of our gradually attained knowledge, *already* and *eternally* exist": or when he speaks of the "best state of man as *already* present to a divine Consciousness"? Must we not think of the divine Consciousness as "in time" if we think of it as "already" such and such. So again, when speaking of the problem suggested by the constant spectacle of unfulfilled human promise, he says "we may content ourselves with saying that the personal self-conscious being, which comes from God, is for ever continued in God":—surely here God is conceived as eternal in the sense of abiding "for ever". Again, it is because the divine mind reproduces itself in the human soul, that that soul is said to have a "spiritual" demand for an "abiding satisfaction of an abiding self"; but how could this be legitimately inferred unless the Divine Mind itself were conceived as abiding and perduring through Time?

But if "in time," why not a substance, since substance is for Green the permanent correlate of change? and can we avoid thinking of the Eternal Mind as the permanent correlate of the processes of change and development essential to finite minds?

Finally, can we conceive the Eternal Consciousness—following Green's thought—as not a cause? He tells us that it is a "source" of the relations which constitute Nature; that they "result from" its combining and unifying action; that it "makes the animal organism its vehicle"; that it "is operative" throughout the succession of events which constitute the growth of the individual mind; that it "acts on the sentient life of the soul" and "uses it" as its organ. Are not these all terms implying causality? And yet he says—arguing against Kant—that "causation has no meaning except as an unalterable connexion between changes in the world of our experience".

Green ultimately sees the inconsistency:—though I think he carries the exposition of the Metaphysics of Knowledge much too far without hinting at it. But I will not digress into mere clothes-washing. Let us rather try to understand the explanation that he ultimately gives. It is, I think, the most difficult passage in the *Prolegomena*:—

"When we transfer the term 'cause' from the relation between one thing and another within the determined world to the relation between that world and the agent implied in its existence, we must understand that there is no separate particularity in the agent, on the one side, and the determined world as a whole on the other. . . . The agent must act

absolutely from itself in the action through which that world is—not as does everything within the world, under determination by something else. The world has no character but that given it by this action; the agent no character but that which it gives itself in this action."[1]

It should be added that the "action," in the same passage, is stated to be "that inner determination of all contained in the manifold world by mutual relation, which is due to the action of the unifying principle".

It appears, then, that Green ultimately attributes to God Causality: but endeavours to establish essential difference between Divine and Natural Causality: *viz.*, that the Eternal Consciousness, as unifying principle, has "no separate particularity" apart from the manifold world, "no character but that which it gives itself in 'its unifying' action"—although it "must act absolutely from itself in the action through which the world is". Now I cannot myself conceive these characteristics united: I cannot conceive anything "acting absolutely from itself" and yet having "no character but that which it gives itself in this action". But, waiving this objection now, I admit that this negation of "character other than that which it gives itself in the action" differentiates the Causality of the Divine Mind profoundly from Natural Causality: but I think it does this at great cost to the system as a whole.

For, first, if God is thus reduced to a mere unifying principle, having no character except that which it gives itself in synthesising the manifold of nature, I do not see how the conception can be made to include the content which the ethical part of Green's doctrine requires. It is because there is a Divine Consciousness realising or reproducing itself in man, that the true good of man is argued to be not Pleasure, but Virtue or Perfection, and Perfection is held to consist in the realisation of capabilities already realised in the Divine Existence: briefly put, man's true good is development in the direction of becoming liker to God. But this whole conception implies that God has what Mr. Balfour calls a 'Preferential Will' in relation to human life and action; and that his Will is realised in man's choice of Virtue in a sense in which it is not realised in his choice of sensual pleasure. Well, I do not see how this conception can be maintained if God is also conceived as having no character except that self-given in unifying the manifold of nature: for this unification is surely equally effected in the lives of

[1] *Prolegomena, Metaphysics of Knowledge*, p. 81.

sinners and in the lives of saints, as both are equally capable of being scientifically known. In short, this conception of the relation of God to the world seems to me to constitute a gulf between Green's Metaphysics and his Ethics which cannot be bridged over.

If, on the other hand, we leave Ethics aside, and confine ourselves to the conception of the Divine Spirit regarded as belonging to the *Metaphysics* of *Knowledge*, it seems to me that this eternal consciousness, characterless apart from its unifying action, is a rather insignificant entity: whose existence is not only difficult to establish logically, but not much worth establishing. The conception, indeed, of the world as a systematic whole, having unity and order through the complex relations of its parts, as well as infinite plurality and diversity; and the conception of the progress of knowledge as consisting in the continual discovery of order, system and unity in what at first presents itself as an almost chaotic diversity—these are conceptions of the highest value. But when they are grasped, what is the further gain to knowledge in referring the unity and system to a unifying principle as its source, if that principle is to have no other character except what it gives itself in its unifying action. Is there any hope that such a conception can in any way help us to *grasp* the unity, the system of relations, more fully and truly? Nay, must not the notion of a Divine Mind, if reduced so far, inevitably dwindle still further, and reveal itself as merely a hypostasised logical element or aspect of the knowable world regarded as a systematic whole?

And this view, I think, will be confirmed by a rigorous examination of Green's main argument for establishing the existence of a spiritual principle in nature. It is the source of the relations that constitute experience a connected whole: but where lies the logical necessity of assuming such a source? Green answers that the existence of the relations involves "the unity of the manifold, the existence of the many in one. . . . But," he says, "a plurality of things cannot of themselves unite in one relation, nor can a single thing of itself bring itself into a multitude of relations . . . there must"—therefore—"be something other than the manifold things themselves which combines them." The argument seems to me unthinkable, because, as Green has emphatically declared, I cannot even conceive the manifold things out of the relations: and therefore I cannot even raise the question whether if I could so conceive them, I should see them to require something other than themselves to bring them into the relations.

But [secondly] Green has another line of argument. He can—he does—appeal to self-consciousness. "The action of our own Mind in knowledge"—he says—gives us a positive conception of the action of the Divine Mind in the universe. Now for myself, in attaining knowledge, I seem to *find* not to *originate* truth. But, granting the human consciousness of "action absolutely from itself" in knowledge, can we infer from this the action of the Universal Mind, consistently with Green's theory of the human spirit? For if my self-consciousness is to be the *causa cognoscendi* of the causality of the *unifying* principle in the world, that self-consciousness must surely include an indubitable cognition of the essential unity of the self: but in trying to think Green's conception of the human spirit, I find the notion of its essential unity vanishes. "Our consciousness," he says, "may mean either of two things; either a function of the animal organism, which is being gradually made a vehicle of the eternal consciousness: or that eternal consciousness itself, as making the animal organism its vehicle." He then assures us that our consciousness is still "one indivisible reality": and that the two things just distinguished are merely two aspects of it, the same thing regarded from two different points of view. I cannot think myself thus: I cannot think God as one aspect of me, and my body as another aspect: and it seems to me that, if I did succeed in thinking this, the essential unity of self would have vanished. Green adduces the old simile of the opposite sides of a shield: but it seems to me inapt. For I see clearly that a shield not only *may* but *must* have two opposite sides, united into a continuous surface by the rim: whereas I cannot see how one indivisible self can possibly have as its two sides an animal organism and a self-limiting eternal consciousness.

I have already detained you long, and yet treated too briefly vast topics; but before I conclude, I should like to say a word on the polemical aspect of Green's Metaphysic. He does not seriously trouble himself with Materialism, and Volitionism does not seem to have come within his ken. Nor, again, is his controversy in the main with Common Sense or Natural Dualism—of which, indeed, his notions are so vague that he speaks of good old Locke as a representative of the "traditional philosophy of Common Sense". It is rather Sensationalism or Phenomenalism which Green regards as his natural opponent, and to the refutation of which he directs much attention. And yet his attitude towards that element of the knowable world which either of these metaphysical views is disposed to take as ultimate, seems to me somewhat fluctuating and obscure.

He repeatedly speaks of Nature as merely a system of thought-relations, and affirms that "if we exclude from what we have considered real all qualities constituted by relations, we find that none are left" — thus apparently resolve all particular qualities in the manifold of experience entirely into relations. Yet elsewhere he seems to admit that "we cannot reduce the world of experience to a web of relations in which nothing is related": and merely argues against the Sensationalist that in the world of knowable facts there is no such thing as "mere sensation, a matter wholly unformed by intelligence". "A fact consisting in mere feeling is an impossibility."

He is equally willing to admit that there is "no such thing as mere thought": and in fact only to contend that feeling and thought are inseparable and mutually dependent. And he expressly affirms this mutual dependence of thought and feeling, not only in the case of our empirical consciousness, but in the case also of "the world-consciousness of which ours is a limited mode". But if this be so, I do not see how Green is justified—or thinks himself justified—in making the thought element so prominent, and the feeling element so subordinate in his account of Nature: or in speaking of Nature as a system of relations, instead of related feelings; or in resolving—as we saw—the particularity of a feeling entirely into relations. And finally, if "mutual independence of thought and feeling has no place in the world-consciousness," difficult questions arise to which Green suggests no answer. For instance, if any feeling is attributed to the world-consciousness, must not all feeling in the world be so attributed? or how are we to distinguish. Does God then feel the pleasure and the pain of the whole animal kingdom? And if so, is not the ground cut from under the anti-hedonistic positions of Green's Ethics? But I perceive that this topic will introduce so great a wave of discourse—as Plato says—that I must reluctantly abandon it: and apologise for the extent to which I have already tried your patience.

III.—ON THE NOTION OF ORDER.

By B. Russell.

The notion of order, although in general neglected by philosophers, has been brought, by modern mathematics, into ever greater prominence. In the theory of number, the whole doctrine of irrationals and of infinity, especially as developed by Cantor, is completely dependent upon order. In Geometry, it has been shown, by the theory of positional manifolds, that the mere possibility of serial arrangement of points, lines and planes suffices for a vast number of theorems. It has been shown also that the essence of projective Geometry lies in the serial arrangement resulting from von Standt's quadrilateral construction—a construction wholly independent of distance and angle. In the whole theory of the Infinitesimal Calculus, and even in the very definition of a function, order has more and more predominated over quantity. But the philosophers have given no thorough analysis of this notion, no adequate discussion of its scope or of its conditions. Indeed, they have in general professed a theory of relations which, if it were correct, would render series logically impossible. It is therefore imperative, in the interests of mathematical philosophy, to supply the defect and to correct the theory. Both will be attempted in the present article.

Before setting forth the conditions which render a series possible, it may be well to point out an important distinction. People are apt to suppose that the order of a set of terms is more or less arbitrary, that we can arrange them as we will, and that there is no intrinsic order among terms. Now it is true that, when a finite number of terms have no intrinsic order, it is possible for us to give them any order we please. But this possibility depends entirely upon the fact that there are sets of terms having intrinsic order, with which any other set of terms can be correlated. A casual collection of terms may be ordered by counting, in which case they are correlated with the integers; by speech, in which case they are correlated with a series of times; or by writing, in which case they are

correlated with a series of places. But the order arises, in each case, from the intrinsic order of the integers, the times, or the places respectively. These have an order independent of our caprice—they form what I shall call *independent* or *self-sufficient* series. The casual terms correlated with them form, on the contrary, only a *series by correlation.* Series by correlation are generated from self-sufficient series as follows: If there be a self-sufficient series A, B, C, D, . . . a collection of terms $\alpha, \beta, \gamma, \delta, \ldots$ and a specific relation R which subsists between α and A, β and B, γ and C, δ and D, etc., but not between α and B or C or D or etc. (with similar exclusions for $\beta, \gamma, \delta \ldots$), then $\alpha, \beta, \gamma, \delta \ldots$ acquire, by correlation with A, B, C, D, . . . the order which belongs intrinsically to A, B, C, D. . . . (In general, α may have the relation R to more than one of the terms A, B, C, D, . . . but in this case its position becomes ambiguous.) Thus all orders by correlation are logically dependent upon intrinsic orders. The latter alone will be considered in what follows.[1]

Order depends fundamentally upon relations having what mathematicians call *sense, i.e.*, such that the relation of A to B is different from that of B to A. Such are east and west, greater and less, before and after, etc. But if order is to arise, another condition is necessary. It must be possible for the same relation with opposite senses to attach to a given term. This excludes such relations as occupation of a place or a time. For though a time may be occupied by an event, there is nothing which the time itself can occupy; and similarly as regards a place. Where both conditions are satisfied, we in general have an order. That is, if there be any relation R, having two senses R_1, R_2; and if a term B have the relation R_1 to A, while it has the relation R_2 to C, then B is *between* A and C, and the three terms have the order ABC or CBA. Thus these two conditions are necessary for an intrinsic order of three terms, and become sufficient if we add that BR_1A, BR_2C are to imply the denial of AR_1C.

As relations of the above type will occur constantly throughout the discussion, it will be well to give them a technical name. For this purpose we may divide all relations into four classes, according as they possess or do not possess each of two attributes. Denoting by "ARB" the proposition "A has a certain relation R to B," ARB may or

[1] The following account of the genesis of order is virtually identical with that of Mr. B. I. Gilman, MIND, N. S., vol. i.

may not imply BRA, while ARB and BRC may or may not imply ARC. When ARB implies BRA, I call R a *symmetrical* relation; otherwise, I call R *asymmetrical*. When ARB and BRC imply ARC, I call R *transitive*;[1] when there is no such implication, I call R *intransitive*. The relations which give rise to series are necessarily asymmetrical, and are also transitive in every particular case known to me, except the doubtful and complex case of genealogy. But we shall find that, provided a series is denumerable in Cantor's sense,[2] it is not *a priori* necessary that the generating relation of a series should be transitive. Even where, however, the generating relation is not transitive, it must be such that a given term of the series (with at most two exceptions) has the generating relation to other terms in both senses. It will be seen that relations having sense are either identical with asymmetrical relations, or closely dependent upon them. The only cases where they are not identical are, so far as I know, cases in which the terms of the relation are themselves asymmetrical relations. Here, though A and B have the same relation as B and A, it may happen that their relation is of opposite sense to that of A and B′ or A′ and B, if A′, B′ be the opposites of A and B. We shall shortly come across a spatial illustration of this case.

It may be worth while to illustrate the above classification of relations by particular examples. What are commonly called identity and diversity of content, if held to be relations at all, are both symmetrical, the first being also transitive, while the second is intransitive. Other symmetrical transitive relations are equality, simultaneity, brotherhood (when taken to include sisterhood). All these, it should be observed, are reducible, as may be proved in each particular case, to possession of a common property, or identity of content. This again, on examination, is found to consist of sameness of relation to the so-called common property[3]; but this remark is a digression. Most symmetrical intransitive relations seem reducible to diversity, and all symmetrical transitive relations seem reducible to identity. Asymmetrical relations, on the contrary, are of many irreducible types, and show very important differences according as they are transitive or intransitive. It should be observed that it is

[1] This term was used in this sense by De Morgan, *e.g.*, *Camb. Phil. Trans.*, ix., p. 104, and x., p. 346. It is now generally adopted.

[2] *I.e.*, provided it either has a finite number of terms, or is such that any assigned term is the nth, if n be a suitably chosen finite number.

[3] *Cf.* De Morgan, *Camb. Phil. Trans.*, x., p. 345.

formally impossible to reduce asymmetrical relations to identity or diversity, since these are both symmetrical. Examples of asymmetrical transitive relations are: greater and less (both in number and quantity), whole and part, logical priority and posteriority, before and after, the two directions on a straight line. Examples of asymmetrical intransitive relations are: occupation of a place or a time, the relation of goodness, truth or beauty to what is good, true or beautiful, the relation of being and existence to entities and existents.

We can now see how order arises among a collection of terms. If it is assumed that there are no ultimate symmetrical transitive relations, such relations being always reducible to identity of relation to some other term, then there remain two principal ways in which order may be generated.[1] Of these the first has the advantage of applying to continuous series, while the second has the advantage of allowing periodic or cyclic series. These two ways are as follows:—

(1) Let there be a collection of terms A, B, C, D . . . and an asymmetrical relation, whose two senses R_1 and R_2 are both transitive. Let this relation subsist between every pair of terms of the collection, so that, if F and K be the two terms, we have either FR_1K or FR_2K, and either KR_2F or KR_1F. Then all the terms of the collection have an unambiguous order. For, with respect to any term F, all the other terms fall into two classes, those having to F the relation R_1, and those having to F the relation R_2. Let K belong to the latter class, so that KR_2F and FR_1K. Then with respect to F and K, all other terms fall into three classes: (α) Terms A for which AR_1F, AR_1K; (β) terms H for which HR_2F, HR_1K; (γ) terms N for which NR_2F, NR_2K. (The case ΩR_1F, ΩR_2K is excluded by the transitiveness of R_1 and R_2. For ΩR_1F and FR_1K imply ΩR_1K, which is inconsistent with ΩR_2K, and therefore there is no such term as Ω.) Of these three classes, the first is said to be before (or after) F and K, the second to be between F and K, the third to be after (or before) F and K. Thus all terms of the series have an unambiguous order with respect to F and K, and therefore (since F and K are arbitrary) with respect to any two terms of the series.[2] When there are no

[1] There are four other ways, of less philosophical importance; but all of these, as well as the second, may be mathematically reduced to the first, which is alone fundamental. For the most important of the other four, see Vailati, *Rivista di Matematica*, vol. v., pp. 76, 183.

[2] This method is that given by Vivanti, *Formulaire de Mathématiques*, vol. i. (Turin, 1896), vi., § 2, No. 8.

terms in class (β), F and K are said to be consecutive; when there are none in class (α), F is said to be the first (last) term of the series; when there are none in class (γ), K is said to be the last (first) term.

(2) In the second way of generating order,[1] the generating relation is still asymmetrical, so that it has two senses R_1, R_2, but these are both intransitive. Here every term of the collection (with the exception of one or two) has the relation R_1 to one term, and the relation R_2 to one other term. There may be one term which has no relation R_1, and there may be one which has no relation R_2. But no term is to have more than one relation R_1 and one relation R_2 to other terms of the series. If F be any term of the series, having the relations FR_2E, FR_1G, we say that F is between E and G and consecutive to them. F is before one of them (say G) and after the other. A term A which has no relation R_2 is called the first term, and a term Z which has no relation R_1 is called the last term. If E is before F, and F before G, E is said to be before G. Thus every term has a definite position in the series. But this method is only applicable where series have consecutive terms, which is not the case with continuous series, such as points, instants, or the real numbers. On the other hand, since R_1 and R_2 are intransitive, this method allows, while the former method in general does not, a cyclic or closed series. For it may happen that, when we reach a certain term Z, proceeding by relations R_1, we find that ZR_1A, A being one of the terms we already had. In this case, the whole series repeats itself. When a series is thus closed, the notion of *between*, or of before and after, must not be extended from consecutive terms to others. If AR_1B and BR_1C, we may still say that B is between A and C. But if further CR_1D, we must not on that account say that B is between A and D. For we may have DR_1A, and thus D will be also between B and A. In order to obtain an unambiguous serial notion applicable to terms which are not consecutive, we now need four terms, as A, B, C, D. Two terms A, C which are not consecutive divide the remaining terms into two classes, these obtained in proceeding from A to C by relations R_1, and these obtained in proceeding from A to C by relations R_2. If B belongs to the first of these classes, while D belongs to the second, B and D are separated by A and C, *i.e.*, any passage from B to D must take either

[1] This is the only method given by Bolzano, *Paradoxien des Unendlichen*, 1850 (§ 7).

A or C on the way. Similarly A and C are separated by B and D.[1] Thus this symmetrical relation of four terms replaces, in a cyclic order, except where three terms are consecutive, the simpler relation of *between* which is applicable to open series.

It should be observed that, if symmetrical relations be allowed as ultimate, there is a third way of generating order, according to which, even in an independent series, it is possible for two or more terms to occupy the same position. This method will have to be adopted by all who deny absolute time, since they will have to admit simultaneity as a direct relation between events. It is as follows: Let a collection of terms $A_1A_2A_3 \ldots B_1B_2B_3 \ldots C_1C_2C_3 \ldots$ be such that any two have either a symmetrical relation R or an asymmetrical transitive relation whose two senses are R_1, R_2. Assume further that A_1RA_2, $A_2R_1B_1$ imply $A_1R_1B_1$, and C_1RC_2, $C_2R_2B_1$ imply $C_1R_2B_1$. Then any two terms which have the relation R are said to have the same position; if one has to another the relation R_1, it is before (after) the other, and the other is after (before) the one. Let all the A's have to one another the relation R, and likewise all the B's, all the C's, etc., while any A has to any B the relation R_1, and so on. In this way again an unambiguous order arises. But it is evident that this case might appear to arise if all the A's had a certain relation R′ to a certain term α, while the B's had the same relation to a term β, and so on, the terms $\alpha, \beta, \gamma \ldots$ forming a series of one of the two former kinds. In this way the necessity for admitting ultimate symmetrical relations is overcome: $\alpha, \beta, \gamma \ldots$ are the positions of the A's, B's, C's . . . respectively, and the independent order is that of the positions, while that of the A's, B's C's . . . is only an order by correlation. The legitimacy of this reduction is, in some cases, a question of first-rate philosophical importance (especially as regards space and time), but I shall not argue it here. My future remarks are to be understood as not applying to series of this third type, if any such there be.

The consideration of logical order—for example the order of Euclid's propositions—suggests a fourth very peculiar way of generating series. Logical order depends upon the relation of implication, but is rendered peculiar by the fact that implication is sometimes symmetrical and sometimes

[1] This four-term relation of separation may be taken as independent, and used to generate a series if our collection of terms having the relation of separation contains at least five terms. See Vailati, *loc. cit.*

asymmetrical. Thus the axioms, in Euclid, together (but not separately) imply the fourth proposition, while this proposition implies some but not all of the axioms required in its proof.[1] The fourth proposition implies the fifth, but the fifth does not imply the fourth. The fifth implies the sixth, and the sixth, together with the axiom of parallels and an axiom of continuity, implies the fifth. The fifth implies the seventh, but the seventh does not imply the fifth. The seventh and eighth have a clear mutual implication, but the seventh is prior, because, unlike the eighth, it is directly implied by the previous propositions. This analysis of implications might be carried further. But what is already evident is this, that a series may, in a way analogous to the second method above explained, be generated by intransitive *symmetrical* relations. If ARB and BRA, BRC and CRB, etc., while no term has more than two relations R, and two terms at most have less than two (*i.e.*, one) such relation, then B is between A and C, C between B and D, and so on. This method again is only applicable to denumerable series. It may be held that, if none of the relations are asymmetrical, we cannot properly speak of an order, since the series has not two distinguishable senses. But if the relation R is sometimes, or even once, asymmetrical, then the series has two senses. In the case of logical order, this is the case. Euclid's fourth proposition implies his fifth, but his fifth does not imply his fourth. Thus if there be a term a for which aRA, but not ARa, we have a reason for putting a at one end of the series, and pursuing the order aABC . . . or . . . CBAa. If further there is no term a' for which a'Ra, the reason for putting a at one end is reinforced. This is the position which the axioms are supposed to hold. If there is no term β for which ZRβ but not βRZ', *i.e.*, if the series has no other end besides a, then a must be put at the beginning. (The order beginning with β is, however, well illustrated in Hobbes' astonished regress from the forty-seventh proposition to the axioms.) In Euclid, R is sometimes symmetrical, sometimes not; terms for which it is not so occur at various points in the series of propositions. This method has, so far as I know, no exemplification except logical order; and as logical order is a very obscure notion, it seems scarcely legitimate to assume that such a method does ever really arise. It deserves to be borne in mind, but can hardly be considered as more than a

[1] The axioms explicitly enumerated by Euclid are grossly insufficient for the proof in question.

suggestion; for a relation which is sometimes symmetrical and sometimes asymmetrical seems intolerable, and should be avoided if possible.[1] I shall therefore say no more of this method in what follows.

It is quite necessary to order that, if BR_2A and BR_1C, R_1 and R_2 should be such that these two propositions together imply the denial of AR_2C and CR_1A. This may be made plain by considering an extremely peculiar relation, which, though it has sense, is yet symmetrical. The relation I mean is that of right or left. Right and left are relations between directed straight lines which do not intersect; any two such lines (which will be called rays, to distinguish them from lines without direction) have one or other of these two relations. For example, with relation to the upward vertical, a line from north to east is one from left to right; with relation to the downward vertical, the same line is from right to left. Thus if A, B be any two non-intersecting rays, and A′, B′ their opposites, denoting by AB the relation between the rays, we have—

$$AB = BA = -AB = -AB' = A'B'.$$

This relation does not allow us to form series of lines, because it is not transitive (*i.e.*, if AB and BC be right-handed, it does not follow that AC is right-handed), and because, what is more, the relation AC may be the opposite of AB and BC (*i.e.*, when these are right-handed, AC may be left-handed). This relation also is the only one known to me which is symmetrical and yet has sense. It is probably capable of analysis, but I have not succeeded in analysing it. In spite of its importance to Kant's philosophy, it has received practically no attention from philosophers.

[1] A little subtlety is required to avoid confusion in this respect. A relation is not symmetrical merely because ARB and BRA coexist, but only if ARB *implies* BRA. Thus the fifth and sixth propositions of Euclid afford a case of mutual implication: for the fifth states: A triangle is isosceles (A) implies that it has equal angles at the base (B); while the sixth states the converse, *B implies A*, and shows in the course of the proof that this is implied by the fifth, *i.e.*, by *A implies B*. But even here there is asymmetry at last: for though *A implies B* implies *B implies A*, yet *B implies A* does not, without the help of other axioms, imply *A implies B*. It is plain that this process of complicating implications may be continued *ad infinitum*, and that asymmetry may appear at any stage. The complication is due to the fact that the relation in question, that of implication, is itself used in the definition of symmetrical and asymmetrical relations. A case of perfect symmetry of mutual implication seems to be afforded by AR_1B and BR_2A, where R_1, R_2 are the two senses of any asymmetrical relation.

Summing up the above account of the genesis of order, we may say—and this covers both ways of generating series—that order is essentially a relation of three terms A, B, C, consisting in the fact that one of them, B, has to the other two, A and C, asymmetrical relations which differ only in sense, while A does not have to C the same relation, with the same sense, that B has to A, nor yet does C have to A the same relation, with the same sense, that B has to C. What the relations to A and C are, is quite irrelevant, so long as they are asymmetrical and differ in sense. What is fundamental is this relation between the two relations, not any direct relation of the three terms A, B, C; for it sometimes happens (*e.g.*, in the series of rational fractions) that one and the same collection of terms has two intrinsic orders, so that, according to the order chosen, B may be between A and C, or A between B and C. This shows that *between* is not a direct relation of the three terms A, B, C. Thus difference of sense—which is the general logical idea underlying difference of sign in Mathematics—is here the fundamental conception. Let us now examine its nature, and the theory of relations which its recognition entails.

It is customary to regard relations as reducible to or as implying adjectives of the related terms. This is involved in Lotze's contention that relations are really internal states of things, and in Mr. Bradley's dogma that no relations are purely "external". Many abstract arguments may be urged against this view, but the consideration of difference of sense makes its inadequacy peculiarly evident. This may be shown by the following quotation from Leibniz:—

"The ratio or proportion between two lines L and M may be conceived three several ways; as a ratio of the greater L to the lesser M; as a ratio of the lesser M to the greater L; and lastly, as something abstracted from both, that is, as the ratio between L and M, without considering which is the antecedent, and which the consequent; which the subject, and which the object. . . . In the first way of considering them, L the greater is the subject, in the second, M the lesser is the subject, of that accident which philosophers call *relation*. But which of them will be the subject in the third way of considering them? It cannot be said that both of them, L and M together, are the subject of such an accident; for if so, we should have an accident in two subjects, with one leg in one, and the other in the other; which is contrary to the notion of accidents. Therefore we must say that this relation, in this third way of considering it, is indeed *out* of the subjects; but being neither a substance, nor an accident,

it must be a mere ideal thing, the consideration of which is nevertheless useful." [1]

Leibniz adopts, in this passage, the theory of relations which has remained orthodox from his day to our own. That relations must be reduced to accidents is a position which, as is evident, he regards as not open to question. Nevertheless the necessity of relations not so reducible is rendered peculiarly evident by the lucidity of his analysis. His position may be stated as follows: When there is an asymmetrical relation R between two terms A and B, this is equivalent to an adjective β attaching to A, and an adjective α attaching to B. The abstract relation R has no being except in a mind contemplating A and B. But the inadequacy of this account is evident when we consider that α involves reference to A, and β involves reference to B. If, as in Leibniz's instance, A and B are two magnitudes of which A is the greater, then α is "less than A," and β is "greater than B". But these are not simply adjectives of their terms: they are analysable, respectively, into *less* and A, *greater* and B. Thus the abstract relations *less* and *greater* remain necessary, and instead of having, in α and β, mere adjectives of B and A, we have in each relations to A and B respectively. Thus the relational form of proposition must be admitted as ultimate: *greater* and *less* must be regarded as two distinct relations, of which it is significant and true to say that, if one holds between A and B, then the other holds between B and A. A is not intrinsically greater, nor B intrinsically less: A will (in general) be less than some magnitudes, and B greater than some others. Thus unless relations be admitted as ultimate, we arrive at a definite contradiction, namely this: An asymmetrical relation shows some difference between A and B, and yet, when either is considered alone, nothing can be found in it which would not be found also in the other considered alone. In short, the two have no difference of adjective, but only the immediate difference which consists in the fact that they are diverse terms.

This argument may be put generally as follows. Let two terms A and B have an asymmetrical relation R, which is to be expressed (if possible) by the adjectives β and α, where β has a reference to B, and α to A. Neither α nor β can be expressed without this reference, and they differ in content, not only by referring to A and B respectively, but also by having different senses. A and B, considered without refer-

[1] Fifth Paper against Clarke, No. 47; Gerhardt's ed., vol. vii., p. 401.

ence to R, have no difference of content corresponding to α and β, though either α or β alone may be considered as expressing a difference between A and B. In fact, α gives to B the adjective of differing from A in a certain manner, while β expresses the same difference with A as starting point. We have thus a difference between A and B, namely that expressed by α or β, but we have no corresponding point of difference. We cannot use the difference between α and β to supply the point of difference, for both state a difference, and therefore, on the traditional logic, presuppose a point of difference. We must, in fact, have a difference between A and B, without any corresponding point in which they differ, or, as it may be put, a conception of difference without a difference of conception. Only when relations are accepted as ultimate, and allowed to be what is called "external," does this cease to be a contradiction.[1]

If we adopt what may be called the monistic theory of relations, and say that they give really an adjective of the whole composed of the related terms, we become liable to an analogous difficulty. For the whole composed of A and B is primarily symmetrical, yet it will have to have a different adjective when A is greater than B from that which it has when B is greater than A. This will require us to distinguish the whole (A, B) from the whole (B, A), which demands an asymmetrical relation between the parts, which was just what we wished to avoid.

We thus see that the difference of sense, or, speaking generally, of sign, is a fundamental and unanalysable logical fact, which is the source of order and series. Some, if not all, relations, other than diversity, are such that, if one of them holds between A and B, then it is not the same relation, but a correlative one, that holds between B and A. It is plain that, if A is related to B, B is also related to A; hence, if B does not have to A the same relation that A has to B, then B must have a relation to A which is correlative to that of A to B. The difference between these correlative relations is the difference of sense.

It is a question of considerable importance in Logic, and particularly in the theory of inference, whether, in cases of difference of sense, we are to speak of one relation with two senses, or of two distinct relations with the relation of

[1] See "The Relations of Number and Quantity," MIND, N. S., No. 23, written while I still accepted the current theory of relations, which I was led to abandon by Mr. G. E. Moore. See his article on "The Nature of Judgment," MIND, N. S., No. 30.

difference of sense. For example, is "A is greater than B" a different proposition from "B is less than A," or do the two only differ grammatically? When we consider these two propositions as wholes, there is much appearance of identity: it seems as though one and the same fact were expressed by both. Nevertheless, when we analyze them, *greater* obviously differs from *less;* thus the two propositions seem to be composed of different constituents, and therefore to be necessarily distinct. To deny that they are distinct, it would be necessary to hold that both *greater* and *less* enter into each proposition, which seems obviously false, or else to hold that what really occurs is neither of the two, but that third abstract relation of which Leibniz speaks in the passage quoted above. In this case, the difference between *greater* and *less* would be one involving reference to the terms A and B. But this view cannot be maintained without circularity: for neither the greater nor the less is inherently the antecedent, and we can only say that, when the greater is the antecedent, the relation is *greater*, when the less, *less*. Thus it seems absolutely necessary to regard *greater* and *less* as distinct relations, and to hold the same of pairs of asymmetrical relations R_1, R_2 generally. We must then say simply that AR_1B implies BR_2A, and is inconsistent with AR_2B and BR_1A. These implications are subsequent to the fundamental fact that R_1, R_2 have that kind of relation which is called difference of sense.

Two ideas of a general kind must now be explained, of which one belongs necessarily to all series, while the other, though not necessary to series, belongs to a large class of series, and in particular to all series of magnitudes. These two may be called *length* and *distance*, provided it is understood that these words are to have no spatial implication. Instead of length, however, it may be better to employ the word *stretch* (*Strecke*), since this word does not suggest space quite so irresistibly as *length* does.[1]

If A and N be two terms in a series, the stretch from A to N consists of all the intermediate terms B, C, . . . M. (For certain purposes, it is convenient to define the stretch as containing also *one* of the end-terms, say N.) Thus the stretch is an assemblage of terms, which, in continuous series, is always infinite. Wherever there is a series, the stretch is definite in the sense that any suggested term of the series can be seen to belong or not to belong to the stretch as the

[1] On the distinction of stretch and distance, see Meinong, *Ueber die Bedeutung des Weber'schen Gesetzes*, Hamburg, 1896; *e.g.*, p. 22.

case may be. But in cyclic series, it is necessary to fix not only the end-terms, but also the sense in which we are to pass from the one to the other, since every pair of terms defines two stretches. The stretch is a whole consisting of many terms, and where there is a finite number of terms, it is measured by counting this number. (For this purpose, one of the end-terms should be included, since then the number of terms in the stretch may be taken as the measure of the distance.)

Distance arises wherever the generating relations of the series are a kind of magnitude. In this case, if R_1, R_2 be as before the generating relations, any two terms A and N have not merely the abstract relations R_1, R_2, but also particular amounts of these relations. In time, for example, one moment is not merely after another, but is also more or less after. In any class of magnitudes, one magnitude is not merely greater than another, but is also more or less greater. And generally, in most particular cases of series, if AR_1B and BR_1C, we have not only AR_1C, but also the relation of A to C is a greater amount of R_1 than the relation of A to B or of B to C. In all such cases, the particular amount of R_1 or R_2 which expresses the relation of A to B is called the distance from A to B, and amounts of R_1 and R_2 are magnitudes differing in sign. It is not strictly necessary, as we saw in discussing the genesis of series, that R_1 and R_2 should be kinds of magnitude. But when this is the case, new inferences are possible. If AR_1B and AR_1C, it was formerly impossible to infer anything as to the relation of B to C. But now we know, denoting by R_{AB} the distance between A and B, that if R_{AB} is greater than R_{AC}, then CR_1B; if less, then BR_1C. And generally, if two terms have distances in the same sense from a given term, the one which has the smaller distance is between the other two. It is important to observe that the difference of two magnitudes of the same kind is always a magnitude, so that the series formed of any class of magnitudes is always one in which we have distance. But the difference is not in general (indeed, strictly, is not ever) a magnitude of the same kind as those whose difference it is. The excess of one pleasure or temperature over another is not a pleasure or a temperature, but a new species of magnitude; and in strictness this is also true of the difference of spatial or temporal distances. But the difference is, in all such cases, what we have defined as a distance. A distance is, in fact, the magnitude of the relation of two terms in a series, whenever this relation has a magnitude—whenever, that is,

the generating relations of the series are species of magnitude.[1]

It may happen that a collection of terms is such that any two of the terms have a relation which is a magnitude, and that, by this means, the terms can be arranged in a series, according as their relation to a given term is greater or less, while yet the relation is symmetrical, and is therefore not of the nature of a distance in the above sense. We shall find that in space, if there be such a relation as distance, this case is exemplified—distance in space, if it exists, must be a symmetrical relation. This case must be carefully distinguished from that of distance in a self-sufficient series. For where the relation is symmetrical, the magnitudes of the relation form the only self-sufficient series, while the terms of the relation form only a series by correlation. Where, on the other hand, there are distances which are asymmetrical, the terms between which the distances hold are a self-sufficient series, as well as the distances themselves. Thus the two cases are quite distinct, and must on no account be confused.

The preceding remarks have, in general, been only applicable to open series, *i.e.*, such as either have one or two ends, or, if endless, do not lead back by successive forward steps to any previous terms. Some remarks on cyclic order seem called for, since the lines in a plane through a point, the planes through a line, and, in finite spaces, the points of a line, form cyclic series. We have already seen that there is no difficulty about such series when they are discrete, since they can be generated in the second manner. But when they are continuous, in the sense of not being denumerable, they have no consecutive terms, and therefore the second method is inapplicable. Cyclic series may easily arise by correlation: for example, $\sin x$ is a cyclic series, though x be an open series. But for Geometry, it is important to discover whether an independent continuous cyclic series is possible. The following method seems to render such a series formally possible, though by a very artificial device: Let the series be one in which we have

[1] It should be observed that there can never be distances in series generated in the second manner, *i.e.*, by relations between consecutive terms only, except by reducing them to series of the first kind—a reduction which, being largely mathematical, cannot be given here. But there are comparatively few instances of series so generated. It is often supposed that causal relations hold only between consecutive events, but this opinion can be formally refuted by considering the continuity of time, in virtue of which there are no consecutive events.

distance, but let no two terms have a distance greater than a certain maximum, M_1 or M_2 according to the sense. Nevertheless, if AM_1B, let there be terms C for which BR_1C, R_1 being a distance in the sense of M_1. Then if distance were always transitive, we should have $AR_1'C$, where $R_1' > M_1$. Thus to exclude this case, we must hold distance to be only transitive so long as its transitiveness does not introduce a distance greater than M_1 or M_2. When such a distance would be introduced, the actual distance is to have the opposite sense, so that, in the above case, instead of $AR_1'C$, we have $AR_2''C$. Then our series will be closed. But the assumptions required are plainly very complicated.

A somewhat less artificial scheme is possible in the case (which is that of directed lines in a plane through a point) where the series itself consists of asymmetrical relations, relations differing in sense occurring in antipodal positions. Thus suppose we have relations A, B, C, D . . . A, B', C', D', . . . A' being the opposite of A, and suppose a relation of the kind required for series to subsist between any two of these relations. If we then assume further that AR_1B implies BR_1A', while CR_2A implies AR_2C', we have pairs of terms naturally marked out as antipodal, and the above account becomes far less artificial. Thus AR_1B and BR_1C coexist with AR_1C, so long as CR_1A'; and so long as this is the case, the stretch from A to C is less than that from A to A'. But if CR_2A', then AR_1B and BR_1C coexist with AR_2C. If AR_1B, BR_1C, CR_1A', we may still say that B is between A and C; but if CR_2A', no one of A, B, C is between the other two. In order to get a relation of order which holds whatever terms we choose, it is necessary to take the relation of four terms already alluded to, which consists in the fact that, of any four terms in a closed series, two are separated by the other two. In our present case, A_1A' are always separated by B_1B'. As a symbol for this order, we may adopt ABA'B'. In open series, we have the fundamental proposition: If B is between A and C, and C is between B and D, then B and C are between A and D. In closed series, this is replaced by: ABCD and ACDE imply ABCE.

It appears from Vailati's work (quoted above) that these four-term relations may be taken as fundamental, and that every series may be taken as open or closed as we like. The only philosophical distinction between open and closed series is the distinction between the case where relations of two or three terms are logically prior, and the case (which

occurs, *e.g.*, in projective Geometry) where the four-term relation is the logically prior.[1]

I shall now apply the foregoing general remarks to various special series. Let us begin with the order of numbers, as being one of the most fundamental.

(1) *Numbers.* That numbers form an independent series, will probably be allowed by those who hold that arithmetical propositions are synthetic. If integers are held to form only a series by correlation, this must be because they are regarded as ordered by successive additions of units. But this view depends upon a false analysis of addition. Addition does not apply to numbers as such, but to terms of any kind. 1 + 1 = 2 is not a proposition as to the pure numbers 1 and 2, for there is only one number 1, and to take it twice over would, as in the Logical Calculus, only yield 1 over again. 1 + 1 = 2 means "one term and one term are two terms," or "A is one and B is one together imply A and B are two". But here the nature of A and B is quite irrelevant, and it seems plain that some relation between the pure numbers 1 and 2 must be implied by so complex a proposition. If there be such a relation, it is evident that it must be asymmetrical. Whether we hold that this relation is only between consecutive numbers, or is between any pair of numbers, it will in either case give rise to an order among integers. Such a relation seems to be found in ratio, provided we strip ratio of its numerical measurement by fractions, and regard it as an intensive magnitude, giving an immediate and indefinable relation between two integers. Since any two integers have a ratio, we shall regard our series as generated in the first manner; and since one ratio is greater or less than another, a ratio is of the nature of a distance. Its numerical measurement, like that of all intensive magnitudes, is in part conventional; but it is interesting to observe that the best measure is not the fraction formed by the two integers, but the logarithm of this fraction.[2] This may be made plain by considering the following general desiderata in numbers which are to be co-ordinates of distances:—

(1) The distance of a term from itself is zero; therefore the number which is the co-ordinate of this distance should be zero.

(2) Equal distances should be represented by the same number.

[1] See Pieri, *I° Principii della Geometria di Posizione*, Turin, 1898; esp. § 7.

[2] *Cf.* Leibniz, Fifth Paper against Clarke, No. 54.

(3) Distance AB = − distance BA; therefore the co-ordinates of these two distances should be equal and opposite numbers.

(4) The numbers representing distances should be additive, so that, if ab, bc, ac be the co-ordinates of AB, BC, AC respectively, then $ab + bc = ac$.[1]

All these conditions are satisfied by $\log m/n$, if m, n be the two numbers whose distance is to be measured. All except the second are satisfied by $(m - n)$. But having agreed that ratio is prior to addition, that "2 is twice 1" is prior to $1 + 1 = 2$, we cannot take distances to be measured by the differences of numbers. If we have once agreed that ratio is the fundamental relation between numbers, then, since equal ratios correspond to equal fractions, we must measure distance by some function of the fraction, and then the logarithm is the only function which is additive. The advantage of the logarithm over the difference may be reinforced, as Meinong points out, by the consideration that the distance between 0 and any finite number is greater than that of any two finite numbers. This distance should, therefore, be represented by a number greater than any finite number—a condition which the difference does not satisfy.[2]

(2) *Whole and Part.* The relation of a whole to any one of its parts is a specific simple relation, correlative to that of part to whole. These two relations are asymmetrical and transitive, and are of the kind which generates series. It may be doubted whether these relations have magnitude, and whether, consequently, they are of the nature of distances. However this may be, it is certain that wholes have more or less complexity or divisibility. In finite wholes, *i.e.*, such as have a finite number of indivisible parts, the divisibility is measured by the number of simple parts, *i.e.*, two wholes having the same number of simple parts have the same divisibility, and one having more simple parts has more divisibility. But where there is not a finite number of simple parts, as with spaces and times, the series of colours of the rainbow, or the stretch of fractions between

[1] *Cf.* Meinong, *op. cit.*, section iv.

[2] It should be observed, however, that all Arithmetic can be successfully deduced if we regard our series of integers as generated in the second manner, by relations which only hold between consecutive integers. This method is best set forth by Peano, *e.g.*, *Formulaire de Mathématiques*, vol. ii., § 2 (Turin, 1898). The decision between the two methods is mathematically unimportant; philosophically, it seems only possible by immediate inspection.

0 and 1, the divisibility cannot be thus measured. There is some reason to regard divisibility as a relation of the whole to its simple parts, since the divisibility of a simple term is zero, not unity, as it would be if it were represented strictly by the number of simple terms composing the whole. Thus divisibility may be regarded as of the nature of a distance.

(3) *Magnitudes.* Every species of magnitude forms a series, in which the generating relations are *greater* and *less.* It should be observed that equality is not a relation between magnitudes, or even strictly a relation at all. Two terms which have the *same* magnitude are called equal: the terms themselves are not magnitudes, but complexes into both of which the same magnitude enters as an element. Thus two yards have the same magnitude, *i.e.*, the distance in the two is not equal, but identical; what is different is the points which have the distance in the two cases. The order of magnitudes is specially fundamental, because, as we have seen, the terms of most if not all series have distances which are magnitudes. Another reason which makes the order of magnitudes interesting is, that all the terms in such an order have distances which in general are magnitudes of a new kind; these distances in turn have an order, and have new distances; and so on *ad infinitum.* It is only the practice of numerical measurement, and of representing distances of magnitudes by the differences of their numerical measures, that has obscured the fact that the distance of two magnitudes is a magnitude of a new kind. It may be doubted, however, whether this is always the case. If there be an exception, it would seem to be in the case of ratio; for it may be held that the distance of two ratios is again a ratio. But however this may be, it must on no account be supposed that the ratio of two integers is ever an integer. The ratio of 2 to 1, for example, is the relation *twice*, which is radically distinct from 2. No integer is a relation, but every ratio is a relation. And it is only thus that our fundamental proposition "2 is twice 1" remains significant, and escapes the condemnation pronounced on 1 + 1 = 2.

(4) *Time.* No difficulties, in regard to our present problem, are offered by time. The generating relations are *before* and *after*, which hold between every pair of instants and are transitive and quantitative. (For we may certainly have more or less priority or posteriority.) Grave difficulties would arise if we were to regard the time-series as primarily one of events; but when it is recognised that events only acquire an order by correlation with the times they occupy,

no difficulties emerge. In relation to time, the distinction between distance and stretch becomes important: the distance from a moment A to a moment B is a certain magnitude of priority or posteriority, which is relational and indivisible; the stretch from A to B consists of all the moments between A and B. It will be seen that the stretch presupposes the time-order, while the distance is prior to it, being one of the generating relations of the order. The only thing about the distance that is not essential to order is the fact that the distance is a magnitude. Relational theories of time hold that the distance alone is temporal, while the stretch consists of events, as do the end-terms A and B of the distance. Absolute theories, on the other hand, hold that the stretch consists of moments. It may be observed that, by the distinction between distance and stretch, it is possible to give a meaning to holes in space or time. It is often said that these are impossible, but we are not often told what it is whose impossibility is asserted. Without the distinction of distance and stretch, a hole can only be a period when there is no time or a place where there is no space, both of which are self-contradictory. But with the distinction, a meaning can be found for holes. There would be a hole in time if there were two moments having no others between them, but yet having a finite distance, *i.e.*, a distance equal to that of two moments which have innumerable others between them. A similar definition applies to space. Thus the denial of holes amounts to the assertion, which is distinctly synthetic, that any two points or moments have others between them, or that finite distances always correspond to finite stretches. (It should be noted that, in continuous series, a finite stretch consists of an infinite collection of terms.)

(5) *Space.* The case of space is interesting and peculiar. For although we might seem to have distance in space, yet it is not by means of distance that the points of a straight line are ordered. They are ordered by means of a relation destitute of magnitude, namely, what I call *direction*.[1] Between every pair of points there are, we may suppose, two relations, distance and direction.[2] Distance, if there be such a relation, is a magnitude, but is a symmetrical relation without sense. Direction is not a magnitude, but is asymmetrical and has sense. (I use direction, not in the

[1] See *Revue de Métaphysique et de Morale*, t. vii., p. 704.

[2] We shall shortly see reason to doubt whether there is any such relation as distance at all.

sense of elementary Euclidean Geometry, in which parallels have the same direction, but in the sense applicable also in non-Euclidean Geometry, in which no two straight lines have the same direction, but two directions are associated with every line.) These two assertions may be proved as follows: (1) Distances may be equal though on different straight lines; but when they are on different straight lines, this difference cannot be represented by difference of sign. Hence it follows that distances are independent of their straight lines, and that the distances AB, BA (when distance alone is considered) are equal, and do not differ in sign. For example, a sphere may be defined as the locus of points having a given distance from a given point. If there be such a relation as distance, no reference to the straight line is involved in this definition, and points at opposite ends of a diameter have the *same* distance from the centre, not distances differing in sign. Hence distance is a magnitude without sign, and is therefore not an asymmetrical relation. Again, distance alone does not suffice for the ordering of points, since, so far as distance is concerned, all the points of a sphere have the same position relatively to the centre. (2) But the points on a straight line evidently have an order, and it is also evident that the direction AB differs from the direction BA. Hence direction is an asymmetrical relation, though not a magnitude. The points of a straight line, except in finite spaces, may be ordered by means of direction alone, in the first manner explained above. For if AB, BC have the same sense, or if BA, BC have opposite senses, B is between A and C; and hence the order is definite.[1] It should be observed that projective Geometry takes the straight line more abstractly, *i.e.*, in what Leibniz in the above quotation calls the third way of considering the relation, in which no regard is had to sense. In projective Geometry, AB and BA are the same straight line, and are not distinguished as opposite directions. Hence, so long as our theorems are purely projective, they do not allow us to assume that the points of a line have an order. A certain order is *proved*, by means of the quadrilateral construction; but this order is distinct from the elementary order resulting from direction.

Thus by means of direction alone, without any appeal to distance, we have shown that the points of a straight line have an intrinsic order, and form a self-sufficient series. Is

[1] In elliptic spaces, the straight line is finite: hence AB has either sense, and the above method fails.

there now any reason for recognising distance as an independent relation at all? This may be legitimately doubted, for, having ordered our points, we now have perfectly definite stretches. We may replace distances by stretches, and compare stretches along different lines. There seems no imperative reason for distances. If it be said that stretches, being infinitely complex, could not be quantitatively compared unless they corresponded to distances, the reply is, that areas and volumes have undoubtedly the same complexity that stretches have, and are yet capable of quantitative comparison. There seems thus no way of deciding the question except immediate inspection; and I confess that, from my own inspection, I am unable to pronounce in favour of either alternative. If, however, we are unwilling to admit symmetrical relations, it becomes necessary to deny distance and admit stretches only.

The series of lines in a plane through a point, and of planes through a line, are probably not independent, since they may be obtained by correlation with the points of a line.[1] Thus the only self-sufficient series of spatial terms, if the above theory be correct, are those formed of the points on straight lines.

If, however, it be held that the lines in a plane through a point do form a self-sufficient series, then they are an instance of the method explained above for generating continuous closed series. Taking straight lines as having direction, in which sense I shall call them rays (so that two rays are associated with every straight line), the angle between two rays is unambiguous. Each ray is an asymmetrical relation, and rays are ordered by the relations of right and left, which are transitive so long as the opposite to the first ray is not passed. It may be observed that this method affords a general interpretation of $\sqrt{-1}$ not essentially dependent upon Geometry. If a series be formed of pairs of asymmetrical relations, and contain distances, then if R_1 be such a distance that, for some pair of terms A, B, we have AR_1B and BR_1A', where A′ is the opposite of A, then $R_1 = \sqrt{-1}$; for, by the very nature of difference of sign, $A = -A'$. We find also that the correlated distance R_2 is the other square root of -1, for we have $A'R_2B$ and BR_2A, and $A' = -A$. Although this abstract account seems incapable of exemplification except in Geometry, yet it is logically quite independent of space, and depends solely upon the possibility of such series of asymmetrical relations.

[1] *Cf. Revue de Métaphysique et de Morale*, t. vii., p. 705.

In addition to the series above discussed, there are a few others which seem to be independent. Such are the colours of the rainbow, and sounds of various pitch. (Loudness is included among magnitudes.) Thus the number of kinds of independent series other than magnitudes is not large. They seem to be: numbers, wholes and parts, instants, the points on a straight line, the colours of the spectrum, and the pitches of sounds. There are doubtless others, which have not occurred to me; but in any case, to be an independent series is to have a distinguished place among entities. This fact explains why such series have great philosophical importance, and why the theory of order is one of the most essential parts of Logic.

IV.—SOME NEW OBSERVATIONS IN SUPPORT OF THOMAS YOUNG'S THEORY OF LIGHT- AND COLOUR-VISION (I.).

By W. McDougall.

The world of physiologists and psychologists is still for the most part divided into two parties on the question of the nature of the physiological processes that underlie our visual sensations; there are those who adhere to the Young-Helmholtz theory, and those who prefer some form of the theory put forward by Prof. Hering. But all are agreed that neither of these theories, as set out originally by Helmholtz and Hering respectively, is adequate to the explanation of all the facts, and several new theories have been propounded, notably those of Prof. Windt and Mrs. Franklin, while various attempts have been made to modify the two older theories so as to bring them into greater harmony with the facts; notable among the latter are the developments given to the Young-Helmholtz theory by V. Kries in his assumption of a separate white-exciting apparatus, and to the Hering theory by Profs. Ebbinghaus and G. E. Müller. Of late years many careful workers have made exhaustive examinations of the vision of colour-blind subjects, and of the peripheral parts of the retina of normal eyes, yet in spite of the skill and patience devoted to these researches, it will be generally admitted, I think, that they have failed to incline the balance decidedly in favour of either type of theory. It has seemed to me that a re-examination of the fundamental and comparatively simple phenomena of vision is much needed at the present time. Such a re-examination I have attempted, and I believe that the results afford conclusive evidence in favour of a modified Young-Helmholtz theory of light- and colour-vision. I should state that I, in common perhaps with most of those who have only a superficial knowledge of the subject, had come to accept the Hering theory as much more satisfactory and probable than the other, and that I was led into this

inquiry by noticing, during the course of observations made for another purpose, facts that seemed quite incompatible with the Hering theory.

I shall first describe in some detail observations on what I shall call " the complete fading of visual images," and on " the mutual inhibitions of visual images ". I have failed to find any mention of these phenomena in the literature of the subject, and yet a right understanding of them seems to me essential to the establishment of a true theory of vision.

With the aid of this new knowledge I shall then examine exhaustively the question of a separate black-exciting process comparable to the processes that excite the sensations of colour, and shall show that the assumption of such a process is unnecessary and groundless.

In the second part of this paper I shall apply the same new knowledge to the elucidation of the phenomena of colour-vision, and shall show how it removes the main difficulties of the Young-Helmholtz theory in this field, and I shall support my conclusions with several series of observations on the images and after-images given by rays of light of fair as well as of low intensity.

Section I.—On the Complete Fading of Visual Images.

So far as I have been able to discover, all writers on the physiology of the visual processes make implicitly or explicitly the assumption that the physiological and psychical processes in the visual areas of the cortex run so exactly parallel to the processes of the corresponding retinal areas that it is legitimate to infer the nature of the retinal processes directly from the nature of our visual sensations; if, for example, we have a distinct sensation of a bright after-image and the after-image disappears from consciousness or changes in colour, it is usually assumed that the retinal processes concerned in the production of the after-image have ceased in the one case or undergone a radical change in the other. This assumption lies at the root of many of the difficulties that arise in trying to explain the visual processes consistently, especially for the Young-Helmholtz theory.

Many facts of common knowledge indicate that this assumption is not valid, and yet they have not been brought together, and the necessary inference has not been made.

Thus in cases of struggle of the two visual fields, parts of

one field frequently disappear from consciousness entirely. Are we then to assume that (1) the retinal processes that were the basis of the sensation of those parts of the field have ceased, although the same rays of light continue to act upon the retina in all its parts; or (2), that the whole series of retinal processes and nervous processes of the corresponding areas of the cerebrum, runs the same course in the two cases, but is in the one case accompanied by consciousness, and in the other case is not? Or (3), is it not rather probable that, while the retinal processes continue unchanged during the period of invisibility of any part of one field, the nervous impulses set up by them in the area of the retina corresponding to this part of the field are prevented in some way by the influence of the competing field from reaching and passing through those parts of the visual cortex in which consciousness is immediately determined?

In the course of this paper I shall show that the first of these alternatives is not the true one. If we accept the second alternative we are driven to suppose that the disappearance of an image from the one field is due to purely psychical inhibition of it by the image excited in the other, *i.e.*, that one psychical process acts directly upon the other to abolish it without affecting the nervous processes by which it is determined. This seems *a priori* improbable, and the phenomena that I have to describe can be so much better accounted for in terms of the third hypothesis that I shall adopt it for convenience of description in this paper, merely noting that should the second one be eventually shown to be the true one, the validity of my conclusions regarding the retinal processes will not be affected. And I shall not attempt in this paper to define precisely the level at which the nervous impulses must be assumed to cease to propagate themselves when in the sort of case in hand a retinal process ceases to affect consciousness.

It is easy to show that the disappearance from consciousness of a visual image during the struggle of the two fields is but a special case of a frequently occurring phenomenon that seems to be due to a disconnexion between the retina and the higher cerebral centres, or failure of the nervous impulses set up by the retinal processes to propagate themselves to those cortical areas whose excitement is accompanied by consciousness.

In the first place, the way in which after-images frequently disappear and then after a few seconds as suddenly reappear, often in form and colour and intensity quite indistinguishable from their previous states, strongly suggests

that the retinal processes have continued unchanged, or only slowly changing during the periods of invisibility.

The suggestion is especially strong in the following case :—

Observation I.—I cut two round holes 2 cm. in diameter, and 5 cm. apart, in a large sheet of white paper and fixed the paper over the opening of a dark box (Dunkel-Tonne), so that the holes appeared as two black discs on the white paper. Then in diffused daylight I fixated a point on the paper midway between the two holes for two minutes. On excluding the light [1] I then saw two equally bright white after-images of the dark discs on a dark ground. After a few seconds they began to disappear and reappear suddenly and irregularly and independently of one another, although, on the whole, tending to alternate with one another, and so continued until they faded away. Yet the conditions that produced the two after-images were exactly the same, and it seems difficult to suppose that the disappearances were due to cessation or reversal of the action of the chemical substances in the retina.

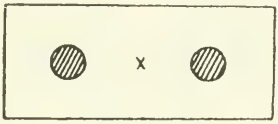

FIG. 1.

A still stronger suggestion in the same direction is afforded by the following observation :—

Observation II.—If after fixating any patch of bright light on a dark background for thirty to sixty seconds, I completely exclude the light and watch the after-image it will disappear entirely if all light be kept from the eyes, perhaps after two or three short periods of invisibility. If then a very little light be admitted to the retinæ for a few seconds (to expose the closed eyes to diffused daylight is often sufficient), the after-image will invariably recur for a short time and fade again after a few seconds when all light is again excluded. If the original after-image be a bright one, it may be revived many times in this way, and at each reappearance it is rather fainter than before, until it can no longer be revived by any

[1] In observing after-images I usually closed my eyes, as in the kind of observation with which I am chiefly concerned this does not introduce any disturbance, and I always, except where the contrary is stated, shut off also all light from the eyelids, either by closing the shutters of the dark room or with a dark cloth.

means. If, in such a case, exciting substances are set free in the retina by the light rays, and if they continue to act slowly upon the nerve endings by a further chemical change, during the whole period in which the after-image is capable of being revived, then it may be expected that these exciting substances will be used up, and the after-image become incapable of revival in the same period of time, whether it be visible during the whole of the period, or only during a part of it. The following series of observations shows that the duration in this sense is, as a matter of fact, the same in the two cases.

I fixated a square patch of bright white light on a dark background for fifteen seconds, and then excluding all light I observed the after-image, and as soon as it seemed to be on the point of disappearing I revived it every time by admitting a little light to the eyes. In this way I kept it continuously visible for five and a half minutes, and during this period it became gradually fainter until it faded altogether and could not be revived. I then, after a rest, fixated the same patch in exactly the same way, and for the same length of time, and then excluded all light from my eyes. The after-image faded completely after thirty-five seconds and remained invisible until after five minutes I admitted a little light, when it reappeared faintly, and it could be revived in this way up to five and a half minutes only.

Of a series of pairs of observations made in this way, all gave the same result, namely, that the period during which the after-image is capable of being revived is the same whether it is present to consciousness for the whole, or only for a small part of the period.

It seems then probable that in the case of after-images the retinal processes to which the image is due may continue to decline in intensity steadily, while the image comes and goes in consciousness or fades and remains absent from consciousness altogether.

If this be true, the question at once suggests itself—Why is it that visual images due to the direct action of light rays have not been observed to intermit in a similar manner? Now it is a well-founded hypothesis, which I have advocated in a former paper in this journal,[1] that perpetual change in the afferent nervous impulses reaching the cerebrum is an essential condition of continued consciousness, and in recent years we have come to recognise, thanks to the

[1] Vol. vii., "A Contribution towards an Improvement in Psychological Method".

experimental labours of Prof. Münsterberg and others, the importance of the part played by afferent impulses from the muscles in sustaining and re-enforcing sensations. But in the case of after-images both these supporting factors—namely, change in the afferent impulses from the sense organ and afferent impulses from the muscles connected with it—are present in very slight degree only. It might then be expected that on very accurate fixation of a steady source of light and relaxation of all the muscles of the eyes, both intrinsic and extrinsic, the image of the source of light might intermit, just as an after-image does. I find that this is the case, and the establishment of this fact is so important that I have made a large number of observations in which I have carefully fixated patches of steady light, relaxing at the same time as far as possible all the muscles of the eyes. Some practice was of course necessary before I could do this with ease, and in my earlier observations I used a dim illumination only. Some typical instances I will describe in detail, copying from my notebooks.

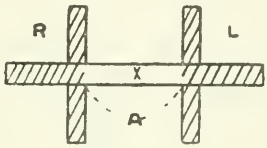

FIG. 2.

Observation III.—I took two strips of white paper about 2 cm. in breadth and 12 cm. in length and laid them upon the dark self-coloured carpet in the form of a vertical cross in the full light of a powerful lamp above my head. Then gazing at the cross I brought the visual axes of the two eyes to parallelism, allowing my accommodadion to relax at the same time. Two images of the cross appeared, of course, gliding apart from one another until the visual axes became parallel, when they formed an image like Figure 2. Of this image the part A is formed by the parts of the horizontal strip that fall on corresponding points of the two retinæ, and it appears as bright white, while the parts R and L are formed on the right and left retinæ respectively, and appear as a duller white. Maintaining the visual axes parallel I looked up and down and all over the figure which during these movements remained absolutely steady and bright. I then fixated carefully at X, avoiding all movement or tension of the muscles of the eyes as far as possible. R and L

began to fade at once evenly and smoothly, and after three seconds they had entirely disappeared, leaving the strip A unchanged in brightness and form. After about three seconds both R and L reappeared suddenly, and the whole figure remained bright as when first fixated for some few seconds, then L disappeared, and then R, leaving A dim but visible in its whole length; then both returned as before; then the whole figure disappeared suddenly and after about three seconds as suddenly returned; then there were comings and goings of parts. This observation I repeated many times, and made the following notes on the series:—

The disappearance of A takes place much less readily than of R and L, and requires great steadiness.

The slightest movement of the eyes always restores the whole figure, and the reappearance of a part or of the whole usually coincides in time with a slight sense of muscular activity in or about the eyes.

In many cases, while the whole double figure was held fast without any sense of effort, the light of its parts flickered and wavered, dying out in large patches and coming again; often a wave of darkness seemed to sweep over the figure from one side or the other, and then before completely obscuring it to retreat, and so come and go several times. Sometimes there was a rhythmical coming and going of the whole figure until some one part refused to go, and the irregular partial fadings would set in. While the parts of the figure were going and coming I could momentarily turn my attention without difficulty to the dimmer objects of the periphery of the field, but sometimes when the whole figure disappeared all the peripheral field became dark also, so that while my eyes remained open and staring at this dim field with the bright white cross in its centre, the whole field disappeared from consciousness, and I experienced a sense of absolute and appalling darkness, very different from the result of merely shutting off all objective light.

In the above observation the fading of R and L may be rightly said to be due in part to the struggle of the two visual fields, *i.e.*, the dark ground of the field of the left eye struggles with the part of the field of the right eye occupied by the vertical strip and the left arm of the cross; but to say this is not to explain the phenomenon, and, as I have said, the disappearance of part of the field of one eye during the struggle of the two fields is but a special case of the more general phenomenon of complete fading of visual images. In the case of the strip A we have complete fading of a

bright image caused by light falling on corresponding areas of the two retinæ, and here "struggle" plays no part.

I will now describe shortly two more typical instances of complete fading chosen from among many observations made under different conditions of colour and illumination.

Observation IV.—The cross used in Observation iii. was placed on a background of dark cloth at a distance of 1 metre from the face and in full lamplight, and was fixated in the same way as before, but with a red glass before the right eye and a blue glass before the left. An image of the form of Figure 2 was again seen, but R appeared red and L blue, while A appeared a bright whitish purple. Then on steady fixation, with the visual axes parallel and accommodation relaxed as before, the three parts of the figure

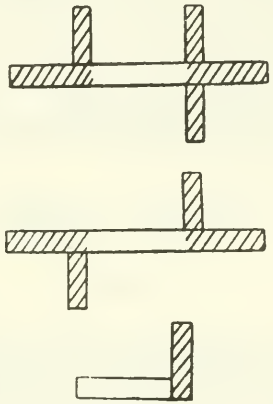

Fig. 3.

faded and returned apparently quite independently of one another. Sometimes the whole figure disappeared, sometimes A only remained. The limbs of the figure tended to fade and return separately, so that there appeared such images as those of Figure 3. A very striking and interesting feature was that the colours frequently disappeared from parts or from the whole figure, leaving the whole figure colourless and of an evenly bright silvery grey and considerably less bright than the original image. On the other hand, the colour sometimes persisted on a fading limb right up to the point at which the limb ceased to be visible. *This separate fading of the colour, leaving a grey image, affords a new proof, if any be needed, of the occurrence of a white-exciting retinal process independent of the colour processes.*

Observation V.—I laid a rectangular slip of white paper 10 cm. in length by 6 cm. in breadth upon a dark ground and fixated a spot at its centre in full lamplight, the visual axes being parallel and accommodation relaxed as before, and with a red glass before the right eye and a blue one before the left eye as in observation iv.

An image like Figure 4 then appeared, the part R being red, L blue and A a whitish purple. Then the following changes occurred:—

1. L faded leaving R and A unchanged.
2. L faded and A became indistinguishable from R, *i.e.*, the whole image of the left eye ceased to affect consciousness.
3. R faded, leaving A and L unchanged or leaving A and L of uniform blue.
4. The whole figure faded, sometimes the red and blue elements successively, sometimes R and L first, leaving A unchanged to fade later.
5. The whole figure became dim and colourless, or the colour of each part faded separately.

In every case the invisibility of any part lasted only from about one to five seconds.

FIG. 4.

I have made a considerable number of experiments on the effect of activity of the ocular muscles in retarding the complete fading of visual images, and I find that while the greatest possible relaxation of all the muscles affords the conditions most favourable to fading, yet it may occur during all kinds of activity of the muscles so long as the image is not thrown on fresh areas of the retinæ, but the greater the muscular activity the longer the fixation necessary before fading will occur, and the activity of the ciliary muscle seems to exert the greatest reinforcing influence. I have also made observations that show a similar reinforcing influence of activity of the ocular muscles upon after-images.[1]

In my account of the fading of after-images I have brought forward some evidence to show that the chemical changes in the retina that I assume to be the exciting cause of the

[1] I hope to publish an account of these observations in a separate paper in which I shall deal with their bearing upon the theory of attention, and discuss the nature of the changes that accompany or determine complete fading.

after-image continue throughout the whole period during which an after-image is capable of revival in consciousness. In the case of direct images it seems *a priori* almost certain that the chemical changes in the retina by which the light-rays excite the nerve-endings must go on during the periods in which the images or parts of images fade from consciousness in such cases as those described above. But in order to prove this I made the following observations:—

Observation VI.—I took two squares of red paper each 2 cm. in width and fixed them on medium grey paper, their centres at my interocular distance apart, and on either side of the left square I fixed a tiny square of white paper, these also at my interocular distance apart. Then, wearing a + 4 D glass before either eye to define the images and assist in obviating accommodatory efforts I allowed my visual axes to become parallel and my accommodation to relax. The patches of paper then appeared as in Figure 5, RL being the image formed by the left-hand patch on the retina of the left eye and by the right-hand patch on the corresponding area of the right eye. Then on fixating the

Fig. 5.

small white patch W, R and L faded very readily, but RL only after longer fixation. But the fading could be prevented for any length of time by very slight movements of the eyes. When I prevented them from fading in this way for thirty seconds and then turned my eyes to some other part of the grey paper, bright blue-green after-images of all three images appeared and lasted a certain number of seconds. But when I fixated W steadily from the first R and L disappeared after about three seconds and remained absent, until after thirty seconds I turned my eyes to another part of the grey paper. There then appeared after-images of R and L exactly similar in colour and saturation and brightness to those which followed the previous fixation and similar also to the after-image of RL which had remained visible during the whole of the period of thirty seconds, and the duration of the after-images was the same in the two cases. Now it is well known that within wide limits the saturation and the duration of after-images observed in this way, *i.e.*, by projection on a grey surface, varies with the length of time that the source of light has acted upon the retina, and it is therefore

necessary to believe that the rays of light from the red patches were producing just the same chemical changes in the retina in both cases, *i.e.*, both when the images were visible for the whole period of thirty seconds, and when they were visible for three seconds only and invisible for the remaining twenty-seven seconds.

Observation VII.—An easier and more striking way to show this is to place a strip of red paper about 12 cm. in length and 3 cm. in breadth upon a sheet of green paper. With the visual axes parallel, an image like figure 6 is seen, of which RL is due to stimulation of corresponding areas of the two retinæ by the red strip while R and L are due to stimulation of areas of the right and left retinæ respectively. If then the figure be steadily fixated at X the piece R will disappear very quickly, after perhaps one or two seconds and will remain invisible for many seconds while RL remains bright red. On then turning the eyes to another part of the green ground an after-image of the whole strip appears as a band of very bright green on the duller green of the ground,

FIG. 6.

and the after-image of the part R is equally bright with that of the part RL.

My most successful observation of this kind was made when I had acquired great facility in the relaxation of the ocular muscles and in steady fixation.

Observation VIII.—I closed the right eye and fixated with the left eye with relaxed accommodation a white spot on a grey ground mid-way between two patches of red paper. The steady fixation and relaxation of the ocular muscles were maintained without any sense of effort for several minutes. The red patches faded completely almost at once, and after a few more seconds the whole field became a misty black and remained so for more than two minutes with occasional very dim appearances of the white spot and sometimes also of the red patches lasting every time less than one second. A very slight lateral movement of the eye then restored the whole field to consciousness, and on turning the eye to another part of the grey paper there appeared vivid blue-green after-images of the two red patches that lasted many seconds.

These observations seem to me to establish beyond question that

a ray of light that usually excites a vivid image may continue to produce in the retina the normal chemical changes without continuing to affect consciousness, if the re-enforcing factors of novelty of stimulus and muscular reaction be precluded.

One other observation is of importance here. It is now generally agreed that the direct image and the after-image have their primary seat in the same part of the cerebro-retinal system, and the following observation affords additional evidence of this.

Observation IX.—If a red patch on a grey ground is fixated for thirty seconds or more and then the green after-image is projected on the grey ground beside the red patch, and the ocular muscles completely relaxed, the red and the green images will usually fade and reappear together, showing that they are affected in the same way by the same factors.

Section II.—The Mutual Inhibitions of Visual Images.

As I have pointed out above, the disappearance of part of one visual field, during the struggle of the two fields, seems to be merely a special case of the more general phenomenon of the complete fading of visual images. This statement finds further support in the following facts: Firstly, the mode of disappearance and reappearance is exactly similar, the fading is smooth and rapid, the return is startlingly sudden; secondly, the fading, whether under the influence of "struggle" or not, is affected in the same way by the same factors. In both cases it is favoured by passivity of the ocular muscles and prevented or much retarded by changes in the visual field and by muscular activity. In this connexion I refer to the paper on inhibition by Mr. Breese,[1] in which he shows that movements of the eyes tend to prevent the fading of parts of the fields during "struggle," and that if the image presented to one eye be made to undergo continual changes (in this case by movements of lines drawn across the field) the complete fading of that image is prevented. I have mentioned above my own observations on the influence of muscular activity in retarding the fading of images not due to struggle. I need only state here that they are in entire agreement with those of Breese.

In the ordinary cases of struggle of the two fields, the fading of part or the whole of one field must be regarded as

[1] Monograph Supplement to the *Psych. Review*, May, 1899.

due to inhibition by the other field, *i.e.*, an image excited in one retina is driven from consciousness, *i.e.*, inhibited, by an image different in form or colour on the corresponding area of the other retina.

The question then presents itself, If different images on corresponding areas of the two retinæ thus inhibit one another, cannot an image formed in one part of the retina inhibit an image in another part of the same retina? The most direct and satisfactory proof of this is afforded by the following observation :—

Observation X.—I fixed a photographic shutter over an opening in the window-shutter of the dark room and over the former a sheet of milk glass, so that when the photographic shutter was opened there appeared on the milk

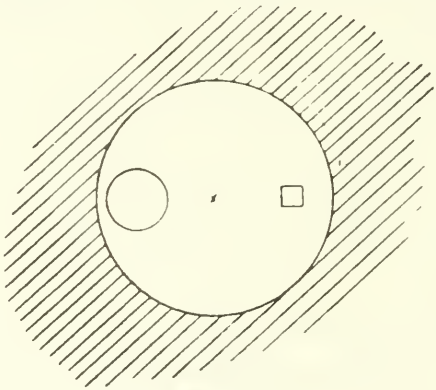

Fig. 7

glass a bright white disc about 5 cm. in diameter. At a distance of 15 cm. from this disc I fixed a square of white paper 2 cm. in width and under an illumination such that I could just read small print held up at the same place. At a distance of 1 metre I fixated a spot midway between the square and the disc, through an artificial pupil about 1·5 mm. in diameter held before the right eye. The field of view was then like the Figure 7, the dull white square at one side of the circle formed by the artificial pupil, and the disc (not yet lit up) at the other side of the circle, and the point of fixation in the centre. After thirty seconds' fixation I opened the photographic shutter, so causing the appearance of the bright white disc; the white square at once disappeared, leaving a dark square in the midst of a less dark haze that filled the circle of the artificial pupil.

On continuing the fixation the square does not regain its previous whiteness, but as the disc darkens from fatigue a dull grey begins to flicker over the square, and with slight waverings of fixation its edges start out in bright white. I repeated this many times, fixating for various periods before lighting up the disc; if this period was only about five seconds the square does not disappear but merely darkens when the disc is lit up, and the longer this period the more the square darkens, until when the period is as much as twenty-five seconds or more the square always fades completely.

This is only one of many similar observations of the complete inhibition of one direct image by another on the same retina. If the artificial pupil is not used the fading of the duller and first fixated image takes place even more readily because the exposure of the brighter disc causes the pupil to contract and so cut off from the retina a part of the rays from the duller square.

A direct image on one retina may also be inhibited by a direct image on the other retina, when the two images do not fall on corresponding parts as they do in the case of struggle of the two fields.

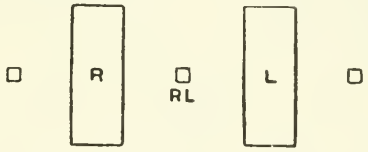

FIG. 8.

Observation XI.—I put a slip of white paper about 5 cm. in length and 2 cm. in breadth upon a flat surface of black velvet, and on either side of it a very small piece of white paper, the two being at my interocular distance apart. Then in strong lamplight and with visual axes parallel, I fixated the right-hand spot of white with my right eye. An image like Figure 8 then occupied the field. On continuing the fixation with relaxed eye-muscles R and L faded completely and returned many times, sometimes together, sometimes separately. If then I brought up a sheet of dark cardboard before the left eye so as to completely fill its field and shut out the image L, R faded less readily than before, but if at any time when R was present to consciousness I withdrew the cardboard a little to the left so as just to expose the image L to the left eye, but no farther, then R always faded completely and at once. If the period during

which L was shut out and R only present had been short, then after exposure of L, R would remain absent from consciousness for a few seconds only, but if the period were longer then R would remain absent for a longer time. In making this observation it is important not to withdraw the screen from the left eye so far as to expose to the black velvet the part of the retina corresponding to that part of the right retina on which the image R is formed, for then the result is not a pure inhibition effect, is not due solely to inhibition of R by L.

An instructive case of the mutual inhibition of images on non-corresponding areas of the two retinæ is afforded by the binocular combination through fixation with parallel visual axes of a vertical and a horizontal white strip on a dark ground. We then have an image like Figure 9 A. Or still more simply we may fixate, with visual axes parallel, a horizontal strip of white paper about 12 cm. in length on a

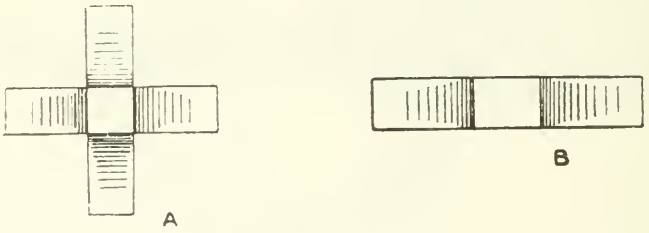

FIG. 9.

dark ground. The lateral parts of the figure then tend to fade irregularly and frequently, but during a large part of the time an image like Figure 9 B appears. The middle piece of bright white is the image formed on corresponding areas of the two retinæ. On either side of this is a grey strip, darkest where it adjoins the middle piece and dull white towards the other end. These are the images formed on non-corresponding areas. They frequently fade completely under the inhibiting influence of the bright middle piece, and this influence appears to be strongest in its immediate neighbourhood, and to diminish regularly with the increasing distance from it.

There remains a fourth conceivable form of mutual inhibition of or "struggle" between direct images, namely, the struggle in consciousness between different images thrown at the same time upon the same area of one retina. The proof of the occurrence of this form of mutual inhibi-

tion I shall defer until I come to treat of colour vision, and I will now turn to the exposition of a factor that determines to a very great extent the predominance of one image over another, whether the two images be formed on corresponding areas of the two retinæ, or on non-corresponding areas of the two retinæ, or on separate areas of one retina. This factor is the newness of the image in consciousness. Of two images, equally bright and large objectively, the one that has been present to consciousness the longer succumbs to one newly appearing to consciousness, and the longer it has been present to consciousness the more readily it succumbs to the inhibiting influence of the other. This appears clearly in both Observations x. and xi. It is owing to this that we get a perpetual alternation of the two fields in most ordinary cases of struggle. It can be well studied by combining binocularly the cross-lined squares of figure x. in plate viii. of Helmholtz's *Physiologische Optik*.

Observation XII.—After a little practice I was able to bring the image of one over that of the other by fixating with visual axes parallel and at the same time maintain full accommodation. Then the two sets of lines alternated in consciousness in patches, but if I fixed my attention upon a short length of two neighbouring parallel lines and steadily fixated them, I found that I could hold them in consciousness while all the neighbouring lines of that set disappeared and those of the other set appeared, so that I saw a single diamond among the parallels. I could continue to hold these two short lengths while the other lines of this set alternated several times with those of the other set, but all the time the effort of attention seemed to grow until I could sustain it no longer and the lines disappeared and remained absent for a considerable period;[1] thus the longer these lines had been present to consciousness, the greater was the effort of attention necessary to retain them and after this prolonged stay a longer period than usual elapsed before they predominated again over the lines of the other set.

If I am right in believing that complete fading is due to a failure of the nervous impulses to propagate themselves through the highest cortical levels, it would seem that this yielding of the image that has been long in consciousness to one newly appearing is due to a fatigue of these highest cortical levels that sets in very rapidly and expresses itself

[1] A similar result of an effort of attention is described by Herr Witasek (*Zeitsch. f. Psy.*, Bd. 19). Breese quotes this as unique and reports that neither he nor his pupils could obtain this result.

as an increased resistance of the nervous paths to the passage of the impulse. This view is further supported by the following fact: If, during Observation iii., the whole figure be kept in consciousness for some time, say thirty seconds, by very slight movements of the eyes, the whole of it tends to fade completely and remain absent from consciousness for a longer period than usual when the movements cease, and the longer the fading has been prevented, the longer is the period it remains absent.

If after-images are due to chemical changes in the retina in just the same sense as are direct images, then they should be subject to similar inhibitions, either by direct images or by other after-images, and this is the case. Perhaps the most elegant method of observing the mutual inhibition of two after-images on one retina is the following :—

Observation XIII.—In the circular opening of a dark box,

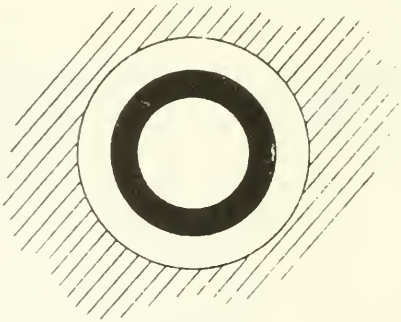

Fig. 10.

I put a ring of white paper, 1 cm. in breadth and about 5 cm. in diameter. Then in bright daylight I fixated the centre of the circle at a distance of 1 yard and for two minutes. During fixation the black inner circle and the broad black ring outside the white ring become suffused with a grey light (simultaneous induction). On excluding all light there appeared at once the negative after-image of the Figure, a bright white disc surrounded by a black ring and separated by it from an equally bright outer ring as in Figure 10. (The grey of the black velvet front of the dark box is bright enough to define clearly the outer white ring of the after-image.) During the first forty seconds both were bright and steady. Then the disc faded completely and suddenly, leaving the ring alone on a dark ground. Then after about five seconds the disc reappeared

and at the same moment the ring faded completely, leaving the disc alone for five seconds. They continued to alternate in consciousness in this way until each had faded nine times. Sometimes as one reappeared the other would persist for as much as two seconds before fading, and twice both were absent together for about two seconds.

I repeated this many times with different periods of fixation and in every case with a similar result, an alternate complete fading of the bright disc and the bright ring in the after-image, beginning after a short period in which both persisted equally bright and continuing until both became dim.

I then varied the conditions by putting a white ground around the circular aperture of the dark box. There was then a more rapid induction of white light over the dark ring than over the central disc and the after-image of the ring appeared brighter than that of the disc. The ring then persisted almost continuously, while the disc kept coming and going.

I then turned the balance in favour of the disc by removing the white paper ground from the dark front of the dark box and putting a small disc of white paper at the centre of the aperture. The after-image then appears as a bright inner ring and a less bright outer ring and the former predominates over the latter, *i.e.*, the inner ring persists while the outer ring comes and goes.

This phenomenon, the mutual inhibition of after-images, may be most easily observed by fixating a bright sky through the window panes. In the later stages of the after-image obtained in this way, the halo (or Lichthof) may usually be seen to alternate in consciousness with the positive after-image of the bright panes.

The inhibition of an after-image by a direct image on another part of the same retina, and on a non-corresponding area of the other retina may be easily observed as in the following cases :—

Observation XIV.—I fixated with the right eye the shaded disc,[1] brightly lit by diffused daylight from the outside with white light, for sixty seconds. On closing the shutter there appeared a bright positive after-image. This I projected on to the dark wall beside the shaded disc at an angle of about 15° from it and then opened the shutter again so as to illuminate the shaded disc again. The after-image at once disappeared entirely for ten seconds and then returned, very

[1] This shaded disc is described in the account of Observation xvi.

dim at first and increasing in brightness. This I repeated many times with a similar result on each occasion. In these observations the left eye was completely covered. I then repeated the observation with this difference only, that when the after-image had appeared, after fixation of the disc by the right eye, I exposed the left eye to the light of the disc, shielding the right eye from its light but projecting the after-image beside the shaded disc and at about an angle of 15° from it as before. The after-image then disappeared at once and returned again as before, the only difference being that in the latter case it remained invisible for a shorter period (about five seconds only) than in the former.

An interesting variation of this observation is the following: Instead of the shaded disc, I fixated, with the right eye only, the brightly lit and sharply bounded disc[1] for thirty seconds. The after-image, a disc of very bright colour, I projected beside the disc and then lighted up the disc again by opening the shutter. The bright colour disappeared at once and a fairly bright white halo appeared around the dark disc that replaced the colour, *i.e.*, the positive after-image was reversed and became a negative after-image. On continuing the exposure to the bright disc, the bright colour of the after-image returned after about ten seconds and then a few seconds later the halo faded completely. This too I repeated many times with similar results. In this case the halo is at first inhibited by the bright after-image, and then when the after-image itself is inhibited by the bright direct image the halo returns to consciousness—the corresponding cortical area being fresh as compared with that of the after-image itself, and then, when the fatigue of the cortical area of the after-image passes off during the period of fading and the after-image returns to consciousness the halo is again inhibited by it. This phenomenon of the reversal of the after-image, from positive to negative or from one colour to another, may be easily observed in a rough manner by opening and shutting the eyes before a sheet of W paper after fixating a bright sky through the window panes.

The consideration of mutual inhibitions of after-images on the same area of the same retina I defer together with the similar case of direct images until I treat of colour vision.

In the previous section I have shown reason to believe that the complete fading of visual images is due, not to a change in the retinal processes, but to a failure of the nervous impulses, excited in the retina by the chemical

[1] See Observation xviii.

changes going on there, to propagate themselves through those highest levels of the retino-cerebral system in which consciousness is immediately determined. In the case of the inhibition of an image formed on one retina by an image on the other retina, it is clear that the antagonistic interaction of the two processes is not in the retinæ but in the brain. To inquire into the mode of this interaction and its exact seat is not necessary for the purpose in hand. I will only remark in passing that the right understanding of this interaction seems to me essential to the understanding of the attention process in general. It seems, however, highly probable that this interaction takes place in the highest levels, and I shall for convenience speak of it as taking place in the cortex of the cerebrum. It is clear that if the antagonistic interaction of images on the two retinæ is cortical then the similar interaction of two images on different parts of one retina is also cortical, for the latter resembles the former in every way and it takes place between images at considerable distances apart on the retina, without producing any appreciable change in the state of the part of the retina between the images.

One other fact of importance appears clearly in all my observations on complete fading and mutual inhibitions—it is that every definitely bounded and homogeneous part of a complex image tends to fade and reappear as a separate whole, more or less independently of the other parts, as in the following case:—

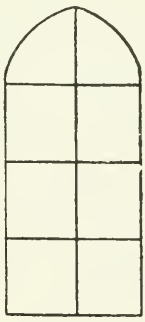

Fig. 11.

Observation XV.—I fixated the middle arch of my Gothic window against an evenly bright white sky for sixty seconds. This section of the window is divided by one vertical and three horizontal narrow leaden strips into eight square

panes. The panes appeared in the after-image all of the same colour and equally bright, nevertheless after some seconds, the four panes of one vertical row faded completely and returned several times while those of the other vertical row remained almost unchanged and then the separate panes began to fade and return quite independently and irregularly.

Section III.—An Examination of the Grounds of Assumption of a Black-exciting Process.

The occurrence of negative or S[1] after-images of W objects has been a great difficulty to the supporters of the Young-Helmholtz theory, and Helmholtz's psychological explanations of the facts of simultaneous and successive contrast and induction (I use these terms in the same sense as they are used by Hering) must be admitted to be unsatisfactory by every impartial observer. It was for the explanation of these facts that Hering introduced the hypothesis of an S-process, *i.e.*, a special physiological process comparable to those concerned in production of the sensation of W or the colour-sensations. And with this hypothesis of an S-process Hering's whole scheme of explanation of light and colour-vision must stand or fall.

If we examine the evidence for the S-process, it appears to consist in the facts of simultaneous and successive contrast and induction of W and S and in the two assertions: (1) that the processes that determine the sensation of S bear to those that determine the sensation of W a relation similar in every way to the relation of the processes that determine the sensations of G to those that determine the sensation of R, or of those that determine the sensation of B to those that determine the sensation of Y, except that there is no objective stimulus for the S-process; (2) that the mixing of S with any colour has the effect of diminishing its saturation in just the same way as the mixing of W with it.

The existence of the greys forming a perfect series from S to W is admitted by Hering to constitute an important difference between the relation of S to W, and that of G to R or B to Y, but he is content to leave it unexplained. Prof. G. E. Müller, on the other hand, attempts to overcome this difficulty by assuming that there is always at work an endogenous cerebral excitation that manifests itself, if pure, *i.e.*, unaffected by processes excited in the retina, as a

[1] I propose to use the letters R, Y, G, B, P, W and S for red, yellow, green, blue, purple, white and black respectively.

medium grey sensation filling the whole visual field, and that the W- and S-processes, adding W or S to this sensation in different proportions, yield in this way the quality-rows, grey to white and grey to black respectively. This assumption seems to me to push the difficulty but one step backwards. It may fairly be asked, Why then is there no similar cerebral excitation of a Y-B process and of an R-G process? and one might dwell upon the difficulty of imagining the phylogenetic origin of such an endogenous grey process bearing this extraordinary relation to the S- and W-processes. But happily this is not necessary. Müller has reduced Hering's somewhat loosely conceived scheme to logical form, and has radically modified it by introducing the conception of reversible chemical processes, affecting three retinal substances, the W-S, the R-G, and the Y-B substances, each of the two opposite changes in each exciting one of the pair of sensations. But in giving it greater definiteness and self-consistency he has rendered it easier to attack. I will therefore quote here his explicit statement as to the way an S after-image must follow stimulation of the retina by W light.

"Das Ueberwiegen der W-Reaktionen ueber die S-Reaktionen, das wahrend der Lichteinwirkung statt-findet, ist (trotz der Mitwirkung des Blutstromes) mit einer Abnahme des W-Materiales und Zunahme des S-Materiales, einer verringerung der Grösse M_w und Erhöhung von M_s verbunden. Wird nun die Lichteinwirkung plötzlich beendet, so kehren die Konstanten K_w und K_s wieder zu ihren anfänglichen Werten (ihren Ruhewerten) zurück. Aber schon bevor sie dieselben völlig wieder erreicht haben, müssen infolge der durch die vorherige Lichteinwirkung bewirkten Erhöhung von M_s und Verringerung von M_w die S-Reaktionen ueber die W-Reaktionen ueberwiegen. Kurze Zeit nach Beendigung der Lichteinwirkung besitzt also die Differenz I_w-I_s einen negativen Werth, die Empfindung ist zu einer vorwiegend schwärzlichen geworden, *wir beobachten das negative Nachbild des vorher wahrgenommenen weissen Objektes. Je länger die Betrachtung des letzteren gedauert hat, und je heller dasselbe war*, desto mehr muss bei aufhören der Betrachtung desselben das S-Material vermehrt und has W-material verringert sein, *desto ausgeprägter muss also das negative Nachbild ausfallen.* Und da mit dem Grade der eingetretenen Vermehrung des S-Materiales und Verringerung des W-Materiales zugleich die Zeit zunimmt, welche verfliessen muss, damit sich das Gleich-gewicht zwischen den W- und den S-Reaktionen wiederherstellt, *so wird mit der Dauer der*

Betrachtung des weissen Objektes und mit der Helligkeit des letzteren zugleich auch die Dauer des negativen Nachbildes zunehmen."[1]

In this explicit statement that the stronger the W light and the longer the period of fixation, the better marked and the more lasting must be the S after-image, we have a touchstone for Müller's theory. This is based not only upon an examination of the facts, but also upon strictly logical deductions from certain psycho-physical axioms, and if observations should show the deductions to be at variance with the facts, then the axioms, so-called, must be *regarded with suspicion* and the method and the conclusions to which it has led must be held to be invalid.

Positive after-images seem to have been quite unfairly neglected by recent observers, and in almost all text-books appear statements that lead the reader to suppose that positive after-images are rare phenomena and difficult of observation. Thus, if I take up at random Sandford's *Experimental Psychology*, I find on page 113: "The positive after-image is of short duration and less readily observed than the negative," and more to a similar effect.

From casual observations I had learnt that in my own case a prolonged positive after-image follows the fixation of W objects more frequently than a negative or S after-image. But the accurate ascertainment of the facts is of fundamental importance, and I have therefore made many systematic series of observations on the after-images produced by the fixation of patches of W light of various intensities and periods of duration and with borders variously defined. I have used various sources of W light, namely sunlight, diffused daylight, and lamplight reflected from white paper, patches of sky and white clouds, and gaslight and daylight, thrown upon milk glass. These all give essentially similar results, and I will describe only three series in each of which the source of light was a patch of daylight reflected from white clouds upon a sheet of white milk glass. The milk glass was suspended over an aperture in the window-shutter of the dark room, and in the aperture was a photographic shutter which, when closed, completely excluded the light, and when opened allowed the light of the sky to fall upon an area of the milk glass.

Observation XVI.—In series A the glass was covered with

[1] G. E. Müller, on "Psycho-Physik der Gesichtsempfindungen" in *Zeitschrift für Phys. u. Psy. der Sinnesorgane*, vol. x., p. 346. The italics are mine.

opaque black cloth, except a circular area in the centre, 12 cm. in diameter, on which the light fell. On the outer or farther side of the glass about a dozen sheets of thin white paper were pasted, each with a circular hole in it concentric with the hole in the cloth. Of these holes the smallest was 2 cm. in diameter, and of the others each was about 1 cm. larger in diameter than the preceding one. On opening the shutter there then appeared a central evenly bright W disc 2 cm. in diameter, and from its margin the brightness diminished regularly through a zone 5 cm. in breadth until at the black cloth there was no perceptible brightness. This disc I shall speak of as the *shaded disc* or A disc.

Observation XVII.—In series B I used a disc with a clear centre of milk glass 5 cm. in diameter, and with a shaded zone 2 cm. in breadth. This I shall speak of as the *half-shaded disc* or B disc.

Observation XVIII.—In series C the milk glass was covered with black cloth, except a central circle 5 cm. in diameter, and this, when the shutter was opened, gave a disc of W light sharply bounded by black cloth. This I shall speak of as the *unshaded* or C disc.

By reflecting sunlight from a flat mirror on to the milk glass I could make the clear areas of the discs a very bright W, and by exposing them to skies of varying brightness, and by putting sheets of white paper outside the milk glass, I could obtain W and greys of all degrees of brightness, down to the dullest grey that would yield any after-image.

With each of these three discs I made many series of observations with different degrees of illumination from very bright W to dull grey. For each degree of brightness I made fixations of 1, 2, 5, 10, 20, 40, 80 and 120 seconds, in every case fixating the centre of the disc with both eyes at a distance of about 50 cm., and shutting off the light completely and suddenly at the end of the period by releasing the photographic shutter.

The results may be summed up by saying that in every case, *i.e.*, with every combination of brightness and duration of fixation, within the limits above mentioned, *the shaded and the half-shaded discs gave only positive after-images that faded slowly and regularly*, with sometimes one or two short periods of "complete fading," until they become too faint to be distinguished from the "intrinsic" light of the retina; *and they never gave a negative after-image, i.e.*, the area of the image never appeared darker than the general field, or than the immediately surrounding parts of the field, at any time during the minutes following the fixation. In the case of

the shaded disc the after-image always appeared shaded off into the general ground just like the disc itself. In the case of the half-shaded disc there was, with combinations of the longer fixations and brighter illuminations, usually some trace of a grey or W halo (Lichthof of Hering), but this was never brighter than the after-image on the directly affected area. In order to describe shortly the nature and course of these positive after-images, I will divide the different degrees of brightness of the centres of the discs into three groups, namely, the bright W, the W of fair brightness and the greys.

The after-images given by discs of the first class, the bright W, are always bright and more or less coloured during the greater part of their duration, and the brighter the disc the more saturated is the colour of the after-image, and the longer the fixation of the disc the longer is the duration of the after-image; but the shorter the fixation (down to one second) the brighter is the after-image in the first few seconds, and the more rapid is the decline of its brightness.

The after-images from discs of the second class, those of medium W, are coloured after all but the shortest exposures, but the colours are usually of low saturation.

The after-images from discs of the third class, the grey discs, are of dull hazy grey, and of short duration (there may be a faint tinge of colour in the first few seconds). The decline of brightness and the duration of the after-images of the discs of the second and third classes follow the same rules as those of the discs of the first class.

Of the after-images given by the disc C, the sharply-bounded evenly-bright disc, it may be said that there always appears some halo effect (some Lichthof), except for the shortest fixations, and the halo is brighter and broader the longer the duration of the fixation. When the brightness of the disc C is of the first class, the area directly affected always appears in the after-image brightly coloured (as with discs A and B), and the halo is usually coloured also, and in a colour different to and approximately complementary to that of the after-image itself. There is then a tendency for the after-image to fade completely for short periods, leaving the area S and surrounded by the bright halo, and also for the halo to fade completely at other moments, and leave the bright coloured after-image alone in consciousness.[1]

[1] I find it very convenient in describing after-images to denote by "after-image" the appearances on the area directly affected by the light rays, excluding the halo or other appearances in the indirectly affected area.

With degrees of brightness of the third class, namely greys, and also after the shorter fixations of brightnesses of the second class, the C disc gives dull grey after-images, sometimes tinged with colour, and usually surrounded by faint halos. The after-image and its halo then die away slowly together, one or other occasionally fading completely for a few seconds.

Lastly, with degrees of brightness of the second class, and with the longer fixations (30-120 seconds) of the C disc the after-image usually appears as an S area surrounded by a more or less bright W halo, and the longer the fixation the brighter is the halo, as in all cases in which the halo appears. The brighter the halo the more completely and continuously dark is the area surrounded by it. But in most cases there appears some light within the area during the course of the after-image, most frequently a dark green of fair saturation. In many cases the area is filled with dull light during the first few seconds, and then there appears a zone of S between it and the halo, and this zone increases slowly until towards the end of the life of the after-image, a small irregular patch of dark green alone remains about the centre of the area bounded by the halo.

In order to prove that I am not peculiarly prone to see positive after-images I have asked two other persons to make similar but less elaborate series of observations on the after-images given by patches of W light using my apparatus. The after-images seen were similar in every way to those described above.

To sum up the results of my observations on the after-images that I see after fixation of patches of W light—Under all conditions, except one narrowly-defined set of conditions, W light gives a positive, *i.e.*, a W after-image only (or if coloured, the after-image is always brighter than the ground) and a negative or S after-image only appears when the patch of W light is sharply bounded by a much darker background and is of medium brightness and is fixated for a fairly long time. These are the conditions that give a relatively bright halo, and such a halo is invariably present when the area directly affected by the W light appears S in the after-image.[1]

[1] I leave out of account the appearances that follow stimulations of the retina of very brief duration, as they do not seem to be of primary importance for my purpose. I am familiar with the rapid darkening and brightening that the after-image frequently undergoes in the first second after the light is suddenly shut off from the eyes, and it seems to me highly probable that this darkening is due to cortical rather than to

It will be noticed that this set of conditions is that which obtains when a patch of white paper is fixated upon a black or dark grey background in the diffused light of any ordinary room. Hering in his original communication,[1] describes only after-images of W light obtained in this way, and most recent observers would seem to have studied chiefly such after-images.

We have seen that Müller is quite explicit, and in the passage I have quoted (p. 73) lays down the requirements of his theory, namely, that fixation of a W patch must give an S after-image in all cases, and the longer the fixation and the brighter the W the more marked must be the S after-image and the longer its duration. My series of observations, xvi., xvii. and xviii., show that this dictum is true only of a very limited class of cases, those, namely, in which the conditions are such as to produce a relatively bright halo, while in all other cases, it is directly opposed to the truth for the after-image produced by the action of W light is positive, *i.e.*, W or grey or coloured, and brighter than the rest of the visual field.[2]

It is an essential part of Hering's theory (as also of Müller's) that the relation of S to W is similar to that of G to R, and of B to Y, and every important exception to this rule must be regarded as a grave objection to the theory and to all theories of this type. In order therefore to compare these relations I have made series of observations on the after-images given by coloured lights under conditions similar to those of series xvi., xvii. and xviii. I used the same discs A, B and C and coloured the discs by placing sheets of coloured gelatine outside the glass plate, so that the light must pass through them before reaching the plate.

retinal changes. I will only refer to the paper by Herr Munk (*Zeitsch. f. P. u. P. d. Sinnesorgane* Bd. 23) in which he shows that the after-image caused by all short periods of stimulation by W light up to two seconds is always positive, *i.e.*, brighter than the ground in spite of the momentary darkening in the first second.

[1] Zur Lehre vom Lichtsinne.

[2] The psycho-physical axioms from which Müller deduces his theory of visual sensations are not axioms in the strict sense of the word, but are an elaboration or detailed setting forth of the doctrine of parallelism or simple concomitance of consciousness that is the foundation of all psycho-physics in Müller's sense of the word. I have set forth in the paper referred to above (MIND, vol. vii.) my reasons for rejecting this doctrine, and when we find that, as in the present instance, logical deductions from it lead to conclusions opposed to the facts we have one good reason the more for asserting that however useful it may have been and still may be as a working hypothesis, yet it is nothing more than that.

I have made in this way with R, G and B light (as well as other colours) series of observations parallel to those with W light.

Observation XIX.—These I may summarise for the present purpose as follows: With the brightest illumination of the discs they all give brightly coloured after-images.

With the lowest intensities (corresponding to the third group of the foregoing series) and also with the shorter durations of medium intensities, the after-image is a grey of a brightness in the first moments varying inversely as the duration of the fixation, as in the W light series.

With medium illumination (corresponding to the brightness of the second group in the foregoing series) all three discs give (except after the shortest fixations) after-images that, though often same-coloured in the first one to three seconds, are very differently coloured, and in the great majority of cases approximately complementarily coloured, through almost the whole of their course. In the case of R and G especially, it is very constantly the rule that R predominates in the after-image of G, and G in the after-image of R.

In the case of the C disc there is usually, as in the case of W light, a well-marked halo about the after-images in this group of cases, and it is usually approximately complementary in colour to the after-image itself.

The discs A and B give then with W light and medium brightness positive, *i.e.*, W after-images, while, under exactly similar conditions, but with coloured light, they give predominantly complementary coloured after-images. In the latter group of cases the complementary after-images appear as the immediate result of the stimulation with coloured light, whereas the appearance of an S after-image after stimulation by W light is dependent upon the presence of those conditions that determine the appearance of a relatively bright halo. Here, then, is a second fundamental difference between the relation of S to W and that of G to R or B to Y.

The Explanation of the Facts of Simultaneous and Successive Contrast and Induction.

I believe that the observations recorded in sections i. and ii., and in the foregoing part of this section, enable us to arrive at the true explanation of the facts of simultaneous and successive contrast and induction as described by Her-

ing.[1] I will first set down shortly what I take to be the true account of the processes concerned in the production of the phenomena of W-vision (including under this term vision of S and all the greys).

When W light acts upon an area of the retina it sets free in it, probably by a process of decomposition of stored-up mother substances, substances that by a further chemical change, probably one of combination, excite or stimulate the rods or cones or both, so that nervous impulses are started in them and are transmitted, under favourable conditions, to the visual areas of the cerebral cortex. The former change takes place under the action of light rays only (or other external stimuli such as pressure), whereas the latter can go on in the absence of all light rays, but is accelerated by their action.

The light rays produce these changes in greater or less amount according to their intensity. The exciting substances, which I shall speak of as the X-substances, are of a highly diffusible nature, and if a sharply-bounded W patch be fixated the X-substances diffuse themselves into all the surrounding parts of the retina and there give rise, under favourable conditions, to impulses that excite the W sensation. *This is simultaneous induction of W.* The cortical processes excited by the W patch tend to inhibit all those of the rest of the visual field, and if the patch be upon or surrounding a dark grey field, the cortical processes of the parts of the visual field in its immediate neighbourhood are completely inhibited and the visual sensations of these parts undergo complete fading for a time, and the area immediately surrounding the W patch therefore appears S. *This is simultaneous contrast.* But with continued fixation the quantity of X-substances diffused into the immediately surrounding area increases until the cortical processes excited by their activity in the retina become too intense to be inhibited by those of the neighbouring W area, and the induced light appears suddenly in consciousness. *The contrast S gives place to induced W.*

When the light rays suddenly cease to reach and act upon the retina, there remains a certain quantity of the X-substances in the retinal area directly affected and also in the immediately surrounding areas into which they have diffused during the fixation. If the W of the patch be of fair intensity and the fixation of short duration, the amount of X-substances per unit area of the directly-affected part and

[1] Zur Lehre vom Lichtsinne.

of the immediately surrounding parts may be approximately equal. Both will then excite a sensation of grey, and this sensation may be present for both areas simultaneously, or owing to mutual inhibition of the two sets of cortical processes the sensations determined in the two areas, the after-image and its halo, may alternate in consciousness. If the W patch be of medium brightness and sharply defined, and the fixation be long continued (sixty seconds or more), the amount of X-substances diffused out is greater, so that the amount of X-substances accumulated in the unit area of the surrounding parts may be greater than in unit area of the directly-affected part, and the fatigue[1] of the directly-affected area is considerable. Hence the cortical processes excited by the activity of the X-substances in the former area predominate over those excited by the X-substances in the latter and completely inhibit them, and the after-image therefore appears as a W halo surrounding an S area. *This is successive contrast and successive induction* (or the formation of a negative after-image). If the W patch be very bright or dull, or the exposure of short duration only, the X-substances diffused out are not so relatively abundant as to cause the predominance of the corresponding cortical areas, and a positive or W after-image appears with or without a halo.

If the W patch is not sharply bounded, but fades off into the dark ground, then there is no considerable accumulation of X-substances about the directly-affected area, and there remains on shutting out the light only a sensation of W excited by the X-substances remaining in the area directly affected. *This is again the positive or W after-image of W light.*[2]

The various statements in the above exposition need separate justification. The statement as to the immediate effects of W light on the retina, namely that it sets free the X-substances, and accelerates their action upon the nerve-endings is suggested by the series of Observations xv., xvi. and xvii. I put it forward as a working hypothesis and the evidence for its truth must be the successful application of it to the explanation of the facts throughout the rest of this paper.

It will be observed that I regard the simultaneously induced W as due to diffusion of the X-substances out of

[1] The nature of this fatigue is complex, and requires special consideration at a later stage of this exposition.

[2] The bright colouring of the after-images, that always in my own case follow stimulation by bright W light, I leave for consideration in a later section.

the area directly affected into the surrounding parts of the retina, and the successively induced W as due to persistence of the action of these diffused X-substances when the light rays cease to reach the retina.

The appearance of S at the borders of the patch of W light (simultaneous contrast) and of S succeeding the W in the directly-affected area (successive contrast), I regard as due to inhibition of all the cortical processes in these areas by the more intense cortical processes of the immediately adjacent areas.

Hering's well-known explanations of these phenomena may be briefly summarised as follows:—

There is in the retina a substance that may be called the W-S-substance. Dissimilation of this substance is the stimulus to the apparatus that excites the sensation of W; assimilation is the stimulus to the apparatus that excites the sensation of S. Stimulation of a retinal area by W light causes dissimilation of the W-S-substance of the area and assimilation of it in the immediately surrounding parts of the retina. Hence the appearance of a W patch surrounded by an S zone (simultaneous contrast). If the W light continues to act on the same area for a considerable period the assimilation in the surrounding parts produces so large a store of material for dissimilation that spontaneous dissimilation sets in and begins to preponderate over assimilation and the S of these parts gives place to W (simultaneous induction). If the W light-rays cease to act on the retina, this store of assimilated material in the surrounding parts continues to dissimilate, causing the appearance of the W halo (Lichthof) (successive induction), and just as the dissimilation of the area acted on by W light caused assimilation in the neighbouring areas, so this dissimilation of the region of the halo now causes assimilation in the area itself, hence the halo surrounds an S area (successive contrast). This area is the more ready to react with a preponderance of assimilation because of the previous dissimilation in it.[1]

I agree then with Hering in regarding simultaneous and successive contrast as essentially similar and successive induction as a mere continuation of the processes set up by simultaneous induction, and regarding the S of the after-image as a contrast effect produced by the halo, the successively induced W light. About this last point there is no

[1] It is characteristic of the elusiveness of Hering's presentation of his scheme that I find it impossible to discover whether he regards one or other or both of these factors as essential to the production of successive contrast.

room for disagreement. If a suitable series of observations be made with increasingly bright halo, the dependence of the S on the W of the halo is obvious. It is necessary then to decide between Hering's explanations of contrast and induction and mine.

For the purpose of argument let us suppose that the contrast S is produced in the way that Hering suggests, and let us consider the production of the induced W. Prof. Götz Martius[1] has shown that there are insuperable objections to Hering's account of the processes. He points out that the induced light may continue to increase in brightness until it becomes very bright—in fact almost as bright as the inducing light—and that it is absurd to suppose this to be due in turn to the presence of excess of W-S material built up by assimilation in the same area; for if the two processes are to go on side by side in the same area a state of equilibrium between them must be reached corresponding to a brightness of low intensity. It is in fact impossible to conceive that a grey brighter than the hypothetical medium grey can be produced by such a balance of assimilation and dissimilation in the same area. Hering, in fact, would make the effect much greater than the cause.

But apart from such considerations, accurate observation suffices to show that Hering's account of the genesis of induced W light is unsatisfactory. Take the following case:—

Observation XX.—I cut out a diamond-shaped piece of S paper (this is of course dark grey only in daylight), about

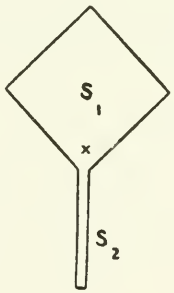

Fig. 12.

6 cm. in width with a narrow tail about ½ cm. in breadth, S_1 and S_2 in Figure 12, and pasted it upon a large sheet of

[1] *Beiträge zur Psych. u. Philos.*, 1896. "Das Gesetz. d. Helligkeitswerthe der negativen Nachbilder," p. 74.

W paper. At a distance of about 1 metre and in bright daylight I fixated the point x and observed the changes of brightness of S_1 and S_2. S_2 and a narrow border of S_1 about ·5 cm. in width became at once S while the rest of the surface S_1 remained a dark grey undergoing no perceptible change of brightness in the first few seconds.

The blackness of S_2 and of the borders of S_1 persisted during twenty to thirty seconds and then suddenly gave way to grey, brighter than that of the centre of S_1. S_1 now appeared as a dull grey patch brightest at its edges and less bright towards its centre. As the fixation was continued the brightness of S_2 and all of S_1 increased, but most rapidly in the centre of S_1 so that soon the whole figure became an evenly bright grey of medium intensity and so continued to increase in brightness for about five minutes. At the end of this period the difference in brightness between the S and the W paper was small. The increase of brightness seems to take place more slowly the longer the fixation has been continued, so that the brightness of the induced light seems to approach that of the inducing light asymptotically. This is the course of the phenomena whenever light is induced upon a fairly large surface and the point to which I wish to draw particular attention is this:—

The induced light appears and becomes bright upon the centre of the large area, although the centre shows no perceptible darkening through contrast in the first moments or at any other period of the fixation. Hering's theory is then quite inapplicable to such cases, for there is brightening without previous darkening, increased dissimilation without previous assimilation, and assimilation is therefore not the cause of the increased dissimilation.

On the other hand, the course of brightening and behaviour of the induced light is just such as is demanded by my hypothesis. It begins at the edge adjoining the W inducing surface and spreads slowly from this, and the longer the fixation is continued the brighter it becomes and the farther it spreads over the dark surface.

Prof. Götz Martius, in the paper to which I have already referred, describes a series of observations on what he calls "die Helligkeits-werthen der negativen Nachbilder" (the brightening value of negative after-images). He fixates a grey disc of variable brightness for twenty seconds upon a grey ground also of variable brightness; he then projects this after-image so obtained on to a second grey disc (*i.e.*, he fixates it with the same area of the retina) and determines the objective brightness that this second disc must have

in order to appear equally bright with the first. He sums up the results of these observations: "Es zeigte sich ganz allgemein dass irgend eine Helligkeit, auf einem dunkeleren Grunde betrachtet, ein verdunkelendes Nachbild erzeugt, und dass umgekehrt eine Helligkeit die dunkler ist als die umgebende, ein aufhellendes Nachbild hervorbringt, welches auch die Helligkeiten seien auf welchen ein solches Nachbild gesehen wird" (p. 43). On another series of observations he bases the general law that with a grey patch on a grey ground of different brightness, the brightness of the patch and the ground approach one another (but never become equal) at a rate proportional to their difference in brightness and to the time of fixation.

Martius's most general conclusion from his observations is that after-images "selbständige, auf selbständigen physiologischen Prozessen (Nachwirkungen der photo-chemische folgen des Licht-eindruckes) beruhende psychische Erscheinungen sind, welche das normale Sehen unberuehrt lassen". He shows that neither the *Ermüdung Theorie* nor Hering's theory is compatible with these conclusions, and declares that a new theory of after-images is needed.

My theory of after-images, on the other hand, demands just such phenomena as are described by Götz Martius, and fits with his general conclusions. For if the phenomenon of simultaneous induction be due to diffusion of the X-substances set free, as I have suggested above, then whenever two grey surfaces adjoining one another are fixated the X-substances, being set free in greater quantity in the area of the retina affected by the brighter surface than in the other, will tend to diffuse from the one to the other until the difference is abolished. The area from which the X-substances have diffused is then relatively poorer in the mother-substances, and therefore gives a darkening (*verdunkelndes*) after-image, while the area into which they have diffused is richer in X-substances, and therefore gives a brightening (*aufhellendes*) after-image. And after-images are due to independent (*selbständige*) physiological processes for they are due to the spontaneous action on the nerve-endings of the retina of the X-substances set free during the action of the light.

To turn now to the consideration of the S produced by contrast. To my mind the assumption that dissimilation in one retinal area can determine assimilation in neighbouring areas seems very difficult to accept. How are we to conceive this interaction between different parts of the retina sometimes separated by a considerable interval? In spite of

assertions to the contrary effect, I do not think that any true physical or physiological analogy can be found for it. It cannot, therefore, be claimed that Hering's suggestion is an explanation in any true sense of the word. In my view, on the other hand, the appearance of contrast S is merely a special case of that tendency to complete fading of visual images under the inhibiting influence of brighter images which I have shown in the preceding sections to be a general law of all visual images. I have made many attempts to devise a crucial experiment that shall decide between the two suggestions, but I cannot claim to have completely succeeded; however, I submit the following as supporting mine rather than Hering's.

Observation XXI.—I laid two sheets of W paper on an S ground with parallel edges at a distance of 2 cm. apart, as in Figure 13 (*a*), and fixated at X for ninety seconds.

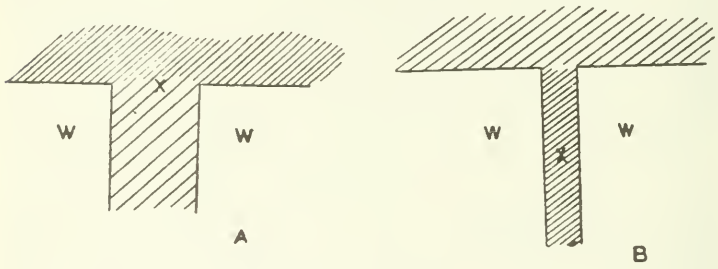

Fig. 13.

During this time there was induced on the strip of S between the W surfaces a grey of fair brightness, and on the S surface above a grey of much lower brightness. I then quickly fixated a spot 5 cm. lower down, X in Figure 13 (*b*), and at the same time pushed the two sheets of W paper towards one another until they were only ·5 cm. apart. Then the whole strip between the two W surfaces appears quite S, *i.e.*, the bright induced light of the lower part of the strip and the faint induced light of the upper part were equally completely abolished.

Now if we accept Hering's theory we should expect both the bright and the dull induced W light to be diminished equally in brightness by the assimilation caused by the dissimilation of the adjacent W areas, and therefore we should expect to see still a difference between the two parts of the strip. But both are quite S, as is to be expected if the abolition of the induced W is due to total inhibition of

the nervous impulses in the corresponding cortical areas. I have made many variations of this experiment which all tend to show that the darkening of contrast is not effected in any way strictly proportional to the brightness of the affected area, as should be the case if it is due to assimilation set up in a dissimilating area.

But the most nearly conclusive kind of observation is that illustrated by Figures 9 (A and B) on page 66. In such cases we see a contrast darkening of the lateral parts of each W strip, and the contrast effect is exerted by the white image of one retina upon the white image on the other. *The contrast effect, therefore, cannot be due to retinal changes in these cases but is clearly due to complete fading owing to mutual inhibition of the cortical processes excited by the two retinal images.* The supporters of the Hering theory will probably refuse to admit the force of this argument, for they will assert that in the case represented by Figure 9 (B) the W of one field, say the right field, yields at the left edge of the middle piece to the S of the left field because along this edge of the W patch it is contending not merely with the S ground of the left field but with a contrast S. And since the above was put into type it has occurred to me that the so-called yielding of W to S in the struggle of the two fields may be claimed as a support for the S-process hypothesis. It is therefore necessary to touch on this subject here. Fechner has discussed this question in an interesting manner (*Abhandl. d. sächs. Ges. d. Wissensch.*, Bd. 5). He writes that when he doubles a W patch on an S ground by regarding it with parallel visual axes, both W images maintain themselves unchanged, showing no tendency to yield to the S ground of the other field; but that when a W strip is regarded in a similar manner (so that it appears like Figure 9 (B) above), then the wings of the figure do yield to the S ground and most so at the edges of the middle piece. He asks—What is the cause of the difference in the two cases? He answers that in the latter case the W yields because it has to contend against the contrast S induced by the W of the other field.

Now I have shown in Section i. that the two images of a patch of W paper on a dark ground may and do fade completely if the fixation be sufficiently accurate (Observation xi.), and I have further shown (Observation iii.) that the fading is not due to the influence of the dark ground of the opposite field because it will occur when the W image of one field is thrown, not upon the dark ground but upon a similar W image of the other field. The greater tendency to fade shown by the wings of Figure 9 (B) is due, I submit, not to

a stronger antagonistic influence of the corresponding S area of the other field, but to the strong inhibitory influence exerted by the middle piece. For the inhibitory influence of the W of both fields is summed together in the cortical areas whose excitement yields this middle piece of the image. This is shown to be the case by the following observation—I placed two squares of W paper on a background of S paper at my interocular distance apart from one another; on regarding these with parallel visual axes they appeared as three W squares, of which the middle one was the brightest, being formed on corresponding areas of both retinæ. The lateral squares were analogous in position to the wings of figure 9 (B). They showed a less tendency to fade than the wings of this figure but a greater tendency to fade than the two images of a single W square. I then brought a narrow slip of S cardboard between the right eye and the right-hand square. The three squares now appeared equally bright and showed an equal tendency to fade, for the middle one, under these conditions, is formed on the left retina only. If now the slip of cardboard is suddenly removed the middle square brightens again and one or other or both of the lateral squares fades completely in the same moment, the image formed on both retinæ preponderates over and inhibits those formed on one only. The same thing is proved more conclusively perhaps by the following observation—I took a stereoscope provided with an object carrier that can be pushed farther from or nearer to the prisms. On to this carrier I fitted a piece of S cardboard large enough to fill the whole field of view. In the cardboard were two square apertures, each about 3 cm. in width and at such a distance apart that when the card stood at a middle distance (about 30 cm.) the image of the left hand hole in the field of the left eye appeared immediately to the left side of the image of the right hand hole in the field of the right eye, while the other two images fell outside the field of view. I fixed a large sheet of evenly bright W paper at some distance behind and parallel to the plane of the card. On looking through the prisms there was then visible only the dark ground with the two W squares upon it side by side. On sliding the card towards the prisms the two images recede from one another, while on pushing it farther from them they approach one another and then overlap more and more. The adjoining edges of the squares were made exactly parallel to one another and a tiny pinhole was made as close as possible to the middle point of each of these two edges. When the two squares stand apart with a dark band between them they appear

equally bright and show no tendency to fade. By pushing the card away from the prisms the squares can be made to approach one another until the two tiny holes coincide and form one bright spot. On accurately fixating this spot the adjoining edges of the W squares may be observed lying parallel to one another at a distance of less than 1 mm. apart. Both edges then remain sharp and bright and the whole of the squares remain as before equally and evenly bright. But if now the card be pushed out a little farther the two images begin to overlap, the overlapped edges form a brighter strip, and on either side of this bright strip appears a band of darkness shading off into the now diminished brightness of the rest of the image, exactly as in the cases described by Fechner (see Figure 9 (B)). Now if Fechner's explanation were the true one we should observe a fading of the edges of the W squares when they lie parallel to one another at a distance of 1 mm. or less, for each is then well within the zone of well-marked border-contrast and the W of either is contending against the contrast S of the other field. But instead of this we find that fading begins when (and not before) the two edges actually overlap and there is formed the image of a bright W strip on corresponding points of the two retinæ. The fading of a W image then, in the binocular combination of W and S fields, is not due to any antagonistic influence of the S of the other field, but is simply a case of complete fading that is favoured by the inhibitory influence of any other W image in another part of the same or the other field, and most so by a W image that is formed on corresponding points of both fields. There is therefore no escape from the conclusion stated above in the sentence printed in italics. In this last observation I find it better to combine the fields by the use of a stereoscope rather than by fixating with parallel visual axes, because with the latter procedure the tendency of the monocular W images to fade is, in my case, inconveniently great.

Finally, if we review the various cases of inhibition of one image by another, that I have described above, it is impossible to deny that the disappearance of the positive after-image of W under the influence of a bright halo is of the same order of phenomena as the other cases of inhibition of one image by another. This is brought out most clearly if the cases be arranged in a series beginning with the inhibition of a direct image formed on one retina by a direct image on the other (Observation xi.), passing then to the case of an image on one retina inhibited by a second image at some distance on the same retina (Observation x.),

then to the inhibition of an after-image by a direct image on the same retina (Observation xiv.), then to the inhibition of one after-image by another at some distance from it on the same retina (Observation xiii.), and lastly to the case of an after-image of a sharply-bounded W patch, in which the halo and the positive after-image alternate with one another in consciousness. And I have shown above that these cases of fading under inhibition by a second image are essentially similar to complete fadings that occur without inhibition and without change in the retinal processes.

I have made many observations with coloured light that bear out my explanations of contrast and induction, but I defer the consideration of these to the second part of this paper.

There remains to be considered the alleged simultaneous contrast effect of S on W or grey. It is asserted by Hering and by Mach,[1] and it is demanded by Hering's theory. Now the most striking and the easiest way to demonstrate the contrast effect of W is by some such arrangement as this:—

Observation XXII.—I put a square of dull medium grey paper 2 cm. in width upon a sheet of W paper, and by the side of the W paper a sheet of the same grey paper. On then fixating any point between the two patches of grey at a distance of 1 metre, the smaller one on the W ground appeared very much darker than the large one. The difference is so striking and obvious that no one can fail to notice it at once.

I then substituted the S of the opening of the dark-box for the W paper, so that the small patch of grey was seen against this S ground. I could not observe any difference in brightness between the two patches of grey under these conditions. I have repeated this observation many times, varying the brightness of the grey paper used and the shape and size of the small patch, and using narrow strips of grey laid across the junction of the two backgrounds, and I have asked several other observers to give their opinion and always with the same result—the W background darkens the small grey patch very markedly; the S background produces no perceptible effect.

It would be absurd for me to assert, in contradiction of such authorities as Hering and Mach, that there is no brightening contrast effect exerted by S, but I think the above observations show that it is of a very much slighter degree than the darkening contrast effect of W. A slight

[1] Mach, *Sitzungsb. d. K. Academie, Wien*, Bd. 52.

contrast effect of the former kind is capable of being explained by my theory as due to darkening of the parts of the large grey area by mutual inhibition, and this seems to be Mach's explanation of the phenomena of this nature described by him.[1]

As an example of the numerous phenomena that can be explained by my theory of induction and contrast, at least equally as well as by Hering's, I will mention the "Dunkelhof" or dark halo of Hering. When a small S patch is fixated on a W ground for about one minute and then suddenly removed, the area of W which it had covered appears brighter than the general W ground and is surrounded by a narrow zone of W or grey darker than the ground. This narrow darker zone is the "Dunkel-hof" of Hering, which he accounts for as being a contrast effect of the brighter W of the area that it surrounds, *i.e.*, as due to increased assimilation caused by the increased dissimilation of the neighbouring area. On the other hand I regard it as due partly to contrast (in my sense of the word, *i.e.*, inhibition by the brighter after-image), and partly to the fact that during fixation the X-substances diffuse into the area of the retina affected by the S patch from the immediately surrounding parts, and so leave these parts relatively poorer in the X-substances.

I must consider here another class of after-image which Hering claims as a strong support to his theory.[2] It is the after-image obtained by a short fixation of a very bright light, as *e.g.*, by a momentary glance at the evening sun. If all light be excluded after such a short exposure to very bright light, there may be seen a bright after-image which fades slowly and continuously and may persist for some minutes. If this after-image be projected on to W paper it may and frequently does become much darker than before. Hering contrasts the behaviour of this bright after-image with that of the bright after-image obtained by fixating a black disc on a W ground. When all light is excluded the latter, like the former, appears as a bright disc fading slowly, but if it be projected upon W paper, the area on to which it is projected appears brighter than the rest of the W paper. Therefore, says Hering, there is a radical difference between the natures of the bright after-images obtained in these two ways. In the case of the former the very bright light has completely used up all the assimilation-material of the area affected, hence, afterwards, in the dark there is no assimila-

[1] Mach, *Sitzungsb. d. K. Academie, Wien*, Bd. 52.

[2] *Zur Lehre vom Lichtsinne*, parag. 35.

tion, but a feeble dissimilation under the influence of the inner stimuli—hence the bright positive after-image. But to do justice to this explanation it is necessary to give it in Hering's own words: "Während der Betrachtung der Sonnenscheibe findet dagegen an der direkt gereizten Stelle nicht nur eine sehr starke Dissimilirung, sondern auch eine sehr bedeutende, wenngleich minder starke Assimilirung statt; durch erstere wird die erregbare Substanz und das D-vermögen stark gemindert, durch letztere das vorhandene A-Material rasch verbraucht. Hieraus resultirt nachher im verdunkelten Auge eine Empfindung, welche auf einer nur schwachen Dissimilirung unter dem Einflusse der innern Reize und auf einer noch schwächeren Assimilirung beruht, also eine Empfindung, die zwar hell ist, aber ein sehr kleines Gewicht hat." This hypothetical state of the retina he calls one of 'assimilation-fatigue'.

Such an after-image of the sun is the brightest, most vivid, persistent and durable kind of after-image that we can ever see. How, then, is it of less 'weight' than other feebler, less durable, and less persistent after-images? It is admitted that during the fixation of the sun there must be extremely rapid dissimilation, and if a fixation of one second is sufficient to give a positive after-image of this sort (due to using up of all assimilation material) then a fixation of two, three or more seconds should use up completely the store of dissimilation material also, and the sun should cease to appear bright and its after-image should be the state of consciousness that corresponds to an absence of chemical changes in the retina. This, however, is by no means the case. The evening sun will cause a brilliant after-image of this kind if fixated for one-half, one, two three or more seconds.

Hering's explanation is then in the last degree unsatisfactory. The fact is that before the phenomena of positive after-images of all kinds Hering's theory stands helpless and hopeless. Hence the phenomena have been hustled into a corner and unfairly neglected. I have already shown that W light of all intensities causes positive after-images, except under the special conditions that determine the production of a relatively bright halo (p. 81) and in the succeeding section I shall show that coloured lights give long-continued positive (*i.e.*, same coloured and bright) after-images under suitable conditions with as great a certainty and regularity as under other conditions they give negative after-images. This incapacity of the Hering theory to deal with positive after-images is sufficient in itself to prove the theory untenable.

The following observations will make clear the true explanation of this kind of after-image :—

Observation XXIII.—I fixated the evening sun for three seconds. With closed and covered eyes the after-image appeared as a very bright disc, and when projected into the bright sunlit surface of the road at any time during the first thirty seconds it still appeared as a brighter spot on the road, but when so projected at any later time it appeared as a darker spot on the bright surface of the road, although with closed and covered eyes it still appeared as a bright disc. I repeated this many times, varying the conditions slightly, and always with similar results.

I then proceeded more accurately thus: I threw a patch of sunlight on to a plate of milk glass, let into the shutter of the dark room and fixated this very bright patch for various short periods. After each fixation I projected the very bright after-image on to a sheet of S velvet beside a sheet of W paper under a fair illumination. The after-image, as in all cases of the positive after image of W, was brighter and declined more rapidly the shorter the period of the fixation. But in every case it was at first brighter than the sheet of W paper, and declined gradually in brightness until it reached and then passed a degree of brightness equal to that of the W paper.

If it was projected upon the W paper at any time before this point in its decline was reached, it appeared on the W paper as a brighter spot and was in fact not perceptibly changed in brightness by the change of background. But if it was projected on to the W paper at any later stage of its decline, then its brightness was absolutely diminished, the change of background caused 'reversal of the after-image,' as Hering puts it.

The true explanation of these phenomena is, I submit, as follows: The intense action of the very bright light decomposes all, or almost all, the mother-substances of the X-substances that are present in the area of the retina affected and when it ceases to act leaves a large excess of the X-substances in the area. These then continue to excite the nerve-endings causing the bright after-image. This bright after-image is independent of, or but little affected by, the background upon which it is projected so long as it is brighter than that ground, but when it is less bright than the background it is darkened by contrast, that is to say, the cortical processes to which it is due are inhibited by the more intense cortical processes excited by the W background. The W after-image that follows fixation of

an S disc on a W ground, on the other hand, is due to the diffusion into that area of the retina which the disc affects of the X-substances set free in the surrounding parts, hence on projecting it on to W paper it appears always as a brighter disc because to the action of these diffused X-substances is added the action of the X-substances newly set free by the W light from the paper. In the case of the after-images of the sun the rays from the W paper cannot increase its brightness in this way because the normal store of mother-substances of the X-substances has been exhausted. The peculiarities of such after-images of intensely bright lights may therefore be said to be due to fatigue or exhaustion of the retinal mother-substances.

I have now shown that all the phenomena of contrast and induction of S and W are to be explained without the hypothesis of a special S-exciting process in the retina. So far as I know the only remaining reason for retaining the hypothesis is the assertion that mixing S with a colour diminishes its saturation just as does mixing W with it. This statement rests upon observations of the kind that is described by Müller[1] in the paper before referred to.

He prepares two composite discs of which each has a middle zone made up of 40° of R and 320° of black cloth; in one which I will call A the rest of the disc is also of black cloth, and in the other B it is of W. If these two discs be rotated side by side on the colour wheel and fixated in turn the R of the ring on A appears more saturated than the R of the ring on B. How, asks Müller, can this be explained by those who do not accept the S-process hypothesis?

In order to obtain light on this question, I made the following observation:—

Observation XXIV.—I made up two discs as follows: Disc A of black cloth with one section of W of about 90°—this on rotation appears of a light grey; and disc B of W paper with a ring of W and S in such proportion that on rotation it appeared of the same brightness as disc A in spite of the contrast darkening effect of the W ground. This required about 120° of W. Then to each ring I added 30° of R. On rotation the R of the ring on A was more saturated than that of the ring on B, and the difference was just about the same in degree as in the case of the two discs of Müller's experiment. I repeated this, varying the brightness of the grey used and also the amount of R added, and the result was always the same, thus: *e.g.*, with 20° of R and 90° of

[1] *Zeitschrift f. P. u. P. d. Sinnesorgane*, Bd. xiv., p. 135.

W in the ring of disc A, and with 20° of R and 120° of W in ring of disc B, the redness of the ring is hardly perceptible on B, but very distinct on A.

Lest any one should criticise this observation on the ground of the unequal amounts of objective W mixed with the R and S of the rings, I made one more variation of the observation.

I put 90° of W and 20° of R and 250° of S in the ring on disc A, and the same amount of W and R and S in the ring of disc B. On rotation the ring on B appeared darker, of course, than the ring on A, and the R was very distinct in the ring on A, but in the ring on B it was hardly perceptible.

(I should add that in every case the colour of the rings was observed during fixation of a point on the edge of the ring or other fixed point.)

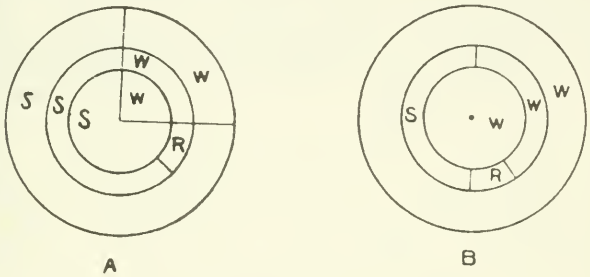

FIG. 14.

In all these cases the R was less perceptible in the ring on the W ground than in the ring on the dark ground, and in every case the grey with which the R was mixed was decidedly a light grey, lighter than the hypothetical medium grey. Addition of contrast S to such a mixture should tend to increase the saturation of the R, because it brings the grey nearer to the medium grey, but it appears that the R becomes less rather than more saturated under the influence of the W ground. This is, I believe, due to direct inhibition of the R by the R element contained in the W light of the ground. The truth of this opinion I shall attempt to prove in the second part of this paper, but however this may be it is clear that the loss of saturation of R in the rings on W ground in my observations is not due to admixture of contrast S. It is in the highest degree probable that the loss of saturation of the R in Müller's experiment and in mine is due to the same cause, and is therefore not due to

admixture of contrast S in the case of Müller's experiment as those who believe in a special S-process would have us suppose.

I have now examined all the evidence for a special S-exciting process, so far as I have been able to discover it, and have shown that no part of it is valid. I will bring this section to an end with a discussion of one or two *a priori* arguments for the existence of an S process.

Hering,[1] in putting forward the hypothesis of a special S process, represents the view that he contends against as assuming the intensest S that we can experience to be a sensation excited by the lowest degree of the process which when intense excites the sensation of bright W, and he points out how improbable this seems. There was some force in this argument when directed against Helmholtz's view of the causation of the deepest S, but it has no force if directed against my view of it. That affection of consciousness I regard as due to an occasional and fleeting inhibition of the processes in some part of the visual cortex which during all the rest of our waking life are determining some affection of consciousness. The resulting state of consciousness I regard as analogous to the consciousness of silence which we have if a long-continued sound suddenly ceases. Such an intermission of a long-continued stimulus to a sense-organ certainly determines a positive affection of consciousness. To take the stock-instance, I will refer to the miller awakened by the stopping of his wheel, or to bring the example up to date, I may recall the extraordinary effect produced in consciousness if during a long ocean voyage on a steam-ship the engines are suddenly stopped and the vibration caused by the screw ceases for a time, or again I may instance in my own case the frequently recurring consciousness of silence which I experience on leaving the roar of London for the quiet country; yet in these cases there is no reason to suppose, and I do not think that it has ever been suggested that a special physiological process determines the consciousness of silence or quiet.

Müller advances the following *a priori* argument in favour of the S process:—[2]

If there were no S-exciting physiological process dark objects would be dealt with as are objects whose image falls upon the blind spot, *i.e.*, the brighter areas between which the dark objects lie would appear to be continuous with one

[1] *Zur Lehre vom Lichtsinne*, parag. 27.

[2] *Zeitschrift f. P. u. P. d. Sinnesorgane*, vol. xiv., p. 412.

another. This is surely due to excess of zeal on behalf of the S process.

It would seem to be equally valid to argue that in the above instances of intermission of long-continued sound there must be a special process for exciting the consciousness of silence, else the sounds must appear to be continuous with one another, the intervals being neglected.

It only remains to point out that the support claimed for the hypothesis of an S-exciting process in the fact that simultaneous contrast is a process of high utility (in that it leads to the sharper definition of the outlines of the brighter areas) can equally well be claimed for the theory of simultaneous contrast set forth above.[1]

[1] Of the observations recorded above some were made at Cambridge, others in my own dark room at Didsbury. During intervals of work directed to another end in the psychological institute at Göttingen I made some observations on after-images of a preliminary character, and I wish to express here my gratitude to Prof. Müller and my appreciation of the liberality with which he placed the many resources of his laboratory at my disposal.

V.—CONSCIOUSNESS, SELF-CONSCIOUSNESS AND THE SELF.

By Henry Rutgers Marshall.

I.

§ 1. No one in these days will deny that modern progress in psychology has been determined to a large extent by the growing conviction that conscious states and neural changes flow on in parallel courses; for it is clear that the close study of neural activities, which has been stimulated largely by interest in the hypothesis of mental and neural parallelism, has thrown much light upon psychological problems.

Conspicuous among the effects of this study of mental states in conjunction with study of neural activities has been the practical abandonment of the atomistic conception of consciousness held by the earlier associationists who treated consciousness as an agglomeration of separate mental elements. As Dr. Stout has said in his *Manual of Psychology*,[1] this doctrine of association pure and simple went into bankruptcy when John Mill felt himself compelled to suggest the hypothesis of "mental chemistry".

But the most effective refutation of this atomistic form of associationism appears in connexion with our observation that the brain which is generally held to be the "organ of mind" is a neural *system*, and that consciousness also has the qualities of a system which is the coincident of the activities occurring in this neural system.

In the neural system we observe what we call elements; but at the same time we realise that they are not elements apart from the system; rather are they conditioned by being inherent parts of the system. These so-called elements we picture as somewhat akin to neural atoms which might be separable entities under other conditions; but we also recognise that they are not separable from the system of which

[1] Book i., chap. ii., § 4.

they form parts without a total alteration of their nature. We realise further that the system acts as a unit, so long as it is a system; and that the so-called neural elements, as they can be studied, are distinguished as being capable of becoming centres of special activity, within the system, which as a whole can but gradually be affected by the activity appearing in the parts. Nevertheless we can never conceive of the specially active neural "element" as part and parcel of the system, without also conceiving the related activity of the system, as a whole; and looking upon its activity as a unit with differentiated yet inseparable parts. The "elements" are what they are because they are inherent parts of the system: the system is what it is because it is formed of elements which under proper conditions may be the centres of newly-appearing activities of the system as a whole.

If consciousness is looked upon as a mental system coincident with the activity of a neural system, we must likewise expect to note, as we do note, what we describe as psychic "elements". Not that these psychic elements are separate entities which being bound together make up consciousness. They, as well as their neural correlates, must be looked upon as conditioned by the fact that they are inherent parts of consciousness; while consciousness as a system is conditioned by the existence of the so-called elements of which, in a sense, it is composed. Consciousness as a psychic system acts as a unit so long as it is consciousness; and the so-called psychic elements, as they can be studied, are distinguished as being capable of special mental activity, as we say, within the conscious system; which conscious system as a whole can but gradually be affected by—can but gradually assimilate—the activity appearing as the mental element. But we cannot conceive of the specially active mental element as part and parcel of the mental system, consciousness, without also conceiving the related activity of consciousness itself as a whole, nor without looking upon this consciousness as a unit with differentiated, yet inseparable parts. The mental "elements" are what they are because they are inherent parts of consciousness. Consciousness is what it is because it is formed, so to speak, of elements which under proper conditions may be the centres of newly-appearing mental qualities in consciousness as a whole, and gradually assimilating with the unit mass.

The consideration of consciousness from this standpoint has already served to elucidate many doubtful points, and to clear away many obscurities which before this conception became current stood as a bar to psychological advance. In

the following pages I wish to consider what light is thrown upon the nature of the state which we call "self-consciousness" by the study of consciousness as a psychic system coincident with the activities of a neural system.

§ 2. When we examine consciousness in reflexion we assume a special attitude. We then become reflective and "self-conscious" as we say. In this state of mind consciousness appears always as of a dual nature; it appears as what is usually called a presentation to our ego. It is, in other words, as though a somewhat extraneous came in upon us; yet this somewhat is of consciousness itself, and for this reason, as well as for others which will appear when we consider the nature of the coincident neural activities, I have become accustomed to speak of this so-called presentation as the "increment" to the ego.

As Mr. Bradley says (*Appearance and Reality*, p. 174): "In self-consciousness a part or element, or again a general aspect or character, becomes distinct from the whole mass and stands over against the felt background. But the background is never exhausted by this object, and it never could be so."

Only in moments of reflexion, however, does this separation appear. In the vast majority of moments of conscious life this separation does not occur. During these usual moments there is but one unity and that of the Self. In other words, at such moments the Self and consciousness are identical.

The Self, when we experience a presentation, is but a part of consciousness. And this Self is itself unpresentable. It is only by an inference from the study of the moment of reflexion, in which we find an ego and its increment, that we assume that in moments when we are not self-conscious there also exists an increment to, and yet of, the Self.

That this inference is warranted I do not question, for there is felt to be no break between the moments of ordinary conscious life and the moments of reflexion; and furthermore if we assume a parallelism between neural and psychic activities, and examine the neural correlate of consciousness, we find ample evidence to warrant us in concluding that during life these neural activities form a continuum in relation to which there is constantly appearing an increment, which itself is a continuum. We are thus warranted in assuming that consciousness exists always as a unit consisting first, of the true Ego, which I speak of as the Self, which cannot itself appear as an increment in our own reflective consciousness, or in other words, which cannot be presented, although it is a part of consciousness; and

second, of what Dr. James Ward calls the presentation continuum, which appears as an increment to this true Ego, this Self.

Under this view the condition of reflexion—of self-consciousness—is a special one in which the increment—the presentation—has a special form ; in which this presentation itself consists, first, of an empirical ego (which is a part of the presentation to the true Self) ; and, second, of an increment (or *quasi* presentation) to this empirical ego ; (which increment to the empirical ego is also a part of the presentation to the true Self).

§ 3. When we turn our attention to the study of the neural activities which appear to be coincident with consciousness, we find, as we have already seen, that these activities are systemic ; and we note that while any neural system to which attention is given acts as a whole, throbs with one wave, so to speak, yet on the other hand that there are constantly developing in certain parts increments to this activity of the whole system. The brain system, as we know it, is active as a whole, yet is constantly receiving new increments of activity from various centres which are stimulated from the environment.

There is every reason to believe that these increments of activity to the whole activity of the neural system are the correlates of what we recognise in reflexion as the presentations to the empirical ego. The activity of the centres stimulated by the optic nerve for instance, appearing as an increment to the activity of the whole brain system, are coincident with the presentation which we call light.

These facts seem naturally to suggest that the activities of the mass of the neural system of which the pre-eminent part is the brain, which activities of the mass are not of the increment to the systemic neural activity of the moment ;—that these activities of the mass are probably the correlates of the part of consciousness which does not appear as the presentation to the unpresentable Self ;—are the correlates of this very part of consciousness which we call the Self. Let us examine this hypothesis more in detail.

§ 4. Unless our conception of neural activities is altogether at fault, the activity of that complex neural system in man, in which the brain is the pre-eminent part, must at any special moment necessarily consist, under the normal conditions of wakeful life, first, of a mass of slight activities —of tremors if we may so speak—throughout the whole system, the result of recurrent reactions to stimuli which are past and gone ; and second, of the special activity of some

inherent subordinate system, which special activity is due to some special stimulus which reaches the subordinate system at the moment under consideration from its physical environment.

This is, of course, an extremely and artificially simplified description of what happens in the nervous system which we are considering. We have in man a complex neural system made up by the integration of many minor systems, each capable under proper conditions of *quasi* separate systemic action; and these minor systems are differently constituted, their elements are differently integrated; and the minor systems are differently integrated with one another.

The activity of such a complex system of systems may perhaps be best pictured as the surfaces of a series of adjacent lakes connected by relatively narrow but unobstructed channels. The surfaces of these lakes we may picture as agitated with small waves moving in different directions, which in certain directions form combinational waves of greater amplitude. Let us suppose that these somewhat regularly agitated, and generally level, surfaces are swept by a variable wind, agitating now one part of one lake, and now another; we then have a fairly accurate picture of the activity of the pre-eminent neural system in man, during a vast proportion of the moments of life.

Let us then suppose that some great boulder rolls into one of the smaller lakes. The high waves produced by the fall of the boulder in this special lake of the lake system will gradually become effective to change the condition of surface vibration through the whole system; and to the observer the agitation of the surface of the special lake into which the boulder has rolled will appear as an increment to the agitation of the water surface of the lake system as a whole.

Consciousness, which corresponds with the neural activities thus pictured, must, under our hypothesis, consist of a mass of minor psychic activities, some of less and some of greater importance in relation to the mass of activities of the psychic system taken as a whole; to which generally active mass must be added from time to time certain increments of psychic activity.

The mass of the psychic activity as a whole is, under our hypothesis, the true Ego, the Self, which being the mass cannot itself be an increment to itself, in other words, cannot be presented; it is the mass which is often spoken of as "feeling": a word which I avoid using, so far as may be, on

account of its varied connotations and careless use in common speech. This Self is changeable in minor particulars as the result of influences from the increments received; but in the main, and relatively, it is persistent and continuous.

The increment to the mass of psychic activity at any moment is, according to this hypothesis, what we speak of as the presentation of that moment. As this increment is ever varying but continuous, so does presentation appear to us as a variable continuum.

Thus do we picture to ourselves the division of consciousness into the Self and the presentation to the Self.

But as we have already seen this Self is not of presentation, and it remains for us to consider the important attitude of reflexion in which the presentation itself appears in a dual aspect: *viz.*, as an empirical ego to which a presentation accrues as an increment.

§ 5. Let us follow the simile already used still farther. The fall of the great boulder into the small lake will form large waves upon the surface of this minor lake, which itself is already more or less agitated. It will add in the first place to the amplitude of the waves on the whole minor lake surface; but beyond that, upon this surface of increased agitation in the minor lake surface will appear higher waves due directly to the fall of the boulder. The effects of this whole higher agitation of this small lake surface will eventually be felt as an increment to the whole mass of the surface the whole lake system; but where the channels connecting the other lakes with this smaller lake are broad enough, the agitation which appears as the increment to the whole surface will indeed consist of a mass of agitation of higher amplitude than that of the surface of the rest of the whole system; but this higher amplitude will itself appear as a mass, upon which will appear the still higher waves caused by the direct fall of the boulder, which will themselves appear as an increment to the agitation of the small lake surface. In this manner the increment to the surface of the system as a whole will itself appear of a double nature; [first] as an agitation of higher degree than that of the lake system, as a whole; to which agitation of higher degree itself [second] an increment is superadded.

Consciousness, which corresponds with the neural activities thus pictured, will thus, in accordance with our hypothesis, under certain conditions, consist of a mass of minor psychic activities, the unpresented Self; to which is added a presentation—an increment of a complex form; which increment itself will appear; [first] as a mass of psychic activity higher

in degree than the activity of the mass; and to which mass of activity itself [second] an increment of activity accrues.

Here, if our hypothesis is correct, we have a case of "Self-consciousness," in which the presentation to the unpresentable Self appears as a complex consisting of an empirical ego to which a presentation accrues.

§ 6. The conception which I am here concerned to set forth may perhaps be presented more clearly by the substitution of another symbolic treatment for that hitherto used.

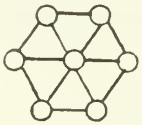

FIG. 1.

Let us suppose the above symbol to indicate, in an artificially simplified form, the activities of a neural system. If we take the circles to indicate the elements of the system, and the lines their inter-connexion, we may vary the size of the circles to indicate variations in the activity of the elements, or of the systems of which the elements are part.

Figure 1 then represents a general condition of activity in which consciousness would be but a mass of "feeling" so called. It would consist only of, and be identical with, the undifferentiated Self. This, in the nature of the case, can never be realised in our reflective experience: for the Self, though of consciousness, can never be presented.

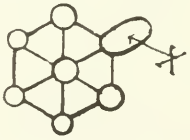

FIG. 2.

In Figure 2 we symbolise a case of normal neural activity where some one element is specially stimulated to activity. In consciousness under such conditions would appear a higher activity of the whole psychic mass than in the case above considered; in other words, we should have the whole mass, the Self, more awake; and to this more wakeful mass would appear as an increment, as a presentation, the one specially active element X.

§ 7. We thus have an explanation of presentation itself, but in terms of symbols which represent most inadequately human consciousness as we experience it. For as the brain is a neural system in which are co-ordinated minor possible neural systems, within broader systems, in indescribable complexity; so consciousness, under our hypothesis, is a psychic system in which are co-ordinated minor possible psychic systems, within broader systems, in indescribable complexity. In connection with a consideration of this high complexity of systems within systems alone do we gain an adequate symbolisation of the facts which we describe as "self-consciousness".

We may better then gain a just conception of the activity of the complex neural system in man, to which human

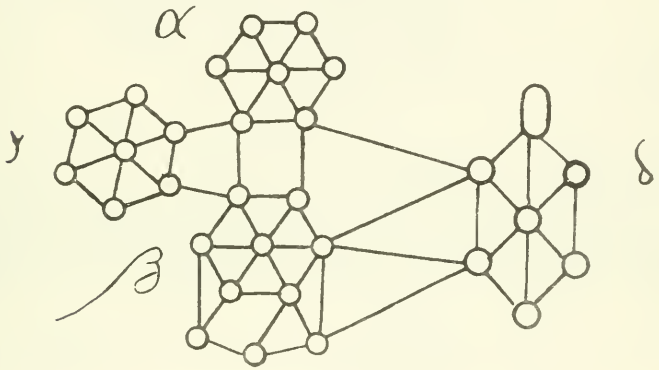

FIG. 3.

consciousness corresponds, by the use of a more complex series of symbols, which nevertheless will of necessity be most artificially simplified.

Figure 3 represents a system which is a complex of four minor systems, α, β, γ, δ. In this complex system some minor system δ is supposed to be a little more active than the rest of the total system, but so slightly more active that all parts of the system will have practically the same degree of activity. Consciousness in such a case will exist as a mere mass of "feeling," will appear to be naught but a Self; a phase of consciousness which can never appear as a presentation in reflexion, but which is nevertheless experienced; and indeed approximately grasped, dimly in such moments as those when we are dropping asleep.

In Figure 4 we represent the case where some elementary

part X of a minor system δ is raised into a relatively high degree of activity. Here we have in consciousness the mass of "feeling," *i.e.*, the Self a, β, γ, δ-X; to which is added as an increment the forceful presentation X, which is the centre of attention. Such is the psychic state when we

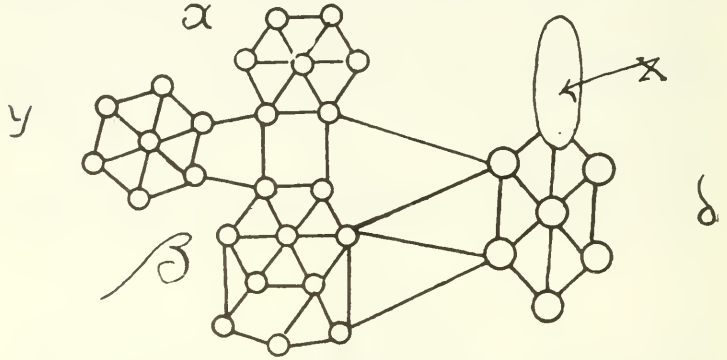

Fig. 4.

receive a sharp blow, or when we hear a sudden noise or see a flash of lightning.

But the elements of each of the minor systems a, β, γ, δ, must be supposed to be more closely bound together than are the minor systems themselves to each other; it is indeed

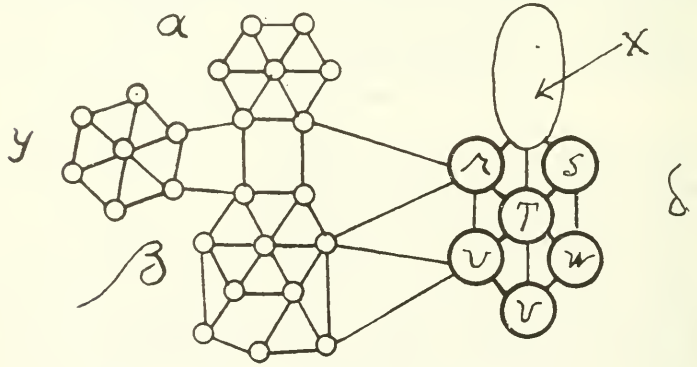

Fig. 5.

only because of this closer bond between the elements that the minor systems appear as parts in a wider complex system. Hence we should expect often to find a condition which is symbolised in Figure 5.

In this case the minor system δ as a whole will appear

as a presentation, as an increment, to the rest of the whole system of systems ($\alpha + \beta + \gamma$).

This whole minor system δ, as presented, will occupy the field of attention, as in the preceding case did the mere element X; but in this case the presentation δ will itself appear as a mass of psychic elements (R + S + T + U + V + W) to which one element (X) appears as an increment.

Under this hypothesis, $\alpha + \beta + \gamma$ represents the Self to which δ is presented; while within δ the mass R + S + T + U + V + W represents the empirical ego, to which X is presented.

We have thus symbolised the reflective state which we speak of as self-consciousness, in which the presentation to the unpresentable Self, which presentation occupies attention, appears as itself a presentation to an ego.

In the symbols above used, as I have before said, the simplification is thoroughly artificial. The systems symbolised by α, β, γ are immensely more numerous and more complex, and the system δ is itself immensely more complex. But if we allow for this weakness it seems to me that we have in this series of figures a suggestion of the basis of the general nature of consciousness as it exists in man.

Of the nature of that part of consciousness which is the true Self we can obtain no direct evidence in reflexion, for this true Self is that to which the increment is presented, and which itself can never be presented in reflexion. That the empirical ego is a presentation, or rather part of a presentation, in the moment of self-consciousness, is incontrovertible.

II.

§ 8. Of the empirical ego, and of the dependence of its characteristics upon our "projective" and "ejective" activities, as Baldwin would put it, we have no need to speak. Of the true Ego, the Self, we may perhaps say a few more words.

Although direct evidence as to the nature of the unpresented and unpresentable Self is not in fact given in reflexion, and under our hypothesis cannot be so given, nevertheless there is opportunity to judge in reflexion of this nature of the Self in connection with the observation of the effects produced upon the forms of presentation by the activity of this true Self. As a matter of fact, observation of these effects seems to the writer to bring into view a large amount of corroborative evidence in favour of the hypothesis

here suggested, evidence, however, which cannot be presented even in outline in an article of limits acceptable to the editors of MIND. A few characteristics of the Self as thus conceived may, however, be mentioned.

In the first place we may note that the Self, under this hypothesis, is a limited psychic system even as the corresponding neural system of the individual man is a limited system. Whether such a psychic system may be related to other similar psychic systems, and how it can be thus related; whether such a psychic system may be, or may under special conditions be modified to become, an element in a psychic system broader than the individual human Self; these are questions of deep interest and importance, which arise in connexion with the development of this hypothesis, but which cannot be touched upon within the limits of this article. We must turn to another consideration.

§ 9. If the hypothesis here presented is true, then as the mass of the activity in the whole neural system is fundamentally not diverse from the activity in the neural element, so the true Self is in its most fundamental nature not diverse from the presentation to this Self. The process by which the presentation is assimilated by the Self is one in which both presentation and Self are equally implicated.

As Prof. Chas. A. Strong[1] has said, "sensations and ideas . . . feelings, acts of will, and the Self as well, are all facts of conscious experience, and in this they have their being. The Self with its feelings and activities is consubstantial with all other mental facts, and is known in the same identical way—the "I" and the "know," the "I" and the "feel," the "I" and the "will," are equally facts of conscious experience."

Presentation appears from one point of view as a body of inherited "Instinct Feelings," or of those closely allied psychic states which are coincident with the expression of deeply ingrained acquired habits; over against which stands Reason as the coincident of variant activities. This conception I have discussed at length in my *Instinct and Reason.* If our hypothesis is correct, the true Self must in its nature be allied with the presented "Instinct Feelings" rather than with variant Reason.

In fact this Self can be little else than a vast bundle of "instinct feelings," which are unemphatic and unified in the mass of the Self just because they are thoroughly coordinated to serve certain ends, and because they act towards

[1] *Psychological Review*, vol. i., p. 76.

those ends without hesitation, *i.e.*, without that emphasis of special elementary parts which on the physical side involves variation from the forms of reaction which are typical for the organism; and which on the psychic side involves the action of what we know as intelligence and reason.

On the other hand, however, it is the Self, itself, which determines what element shall be emphasised, as it is the activity of the coincident neural system as a whole which determines what neural element shall become emphatic in the production of variation from typical organic reactions. As a stimulus coming to a neural system fails to alter the nature of the activity of the system, unless the system itself is capable of reaction to the special form of energy appearing in the stimulus, so under this hypothesis a psychic system affected by a psychic stimulus, so to speak, fails to be altered by the stimulus reaching it unless the psychic system itself, the Self, can react to the psychic stimulus—can assimilate itself to the newly-suggested forms of psychic activity.

Under this conception, moreover, the Self appears as the resultant in ourselves of the experience of the ages; its activity represents the advice of all of our countless ancestors who teach us in our own persons of the course to follow if we are to take advantage of this experience embodied in the reaction of this Self.

And if this is true the pressure from the Self should rightly have great weight in determining our actions where processes of ratiocination leave us in doubt. More than that they should be attentively listened to, even when they oppose trends of action or thought which appear to be thoroughly rational.

For it must be remembered that under our hypothesis the ratiocinative process is merely a special case of the general process in consciousness; a special case in which the mechanism of the process, if we may so speak, is brought more or less clearly into the field of attention. But surely there is no ground for the contention that the special form of consciousness in which reasoning appears clear is inherently nobler and more worthy of consideration than those vastly broader, although less vivid, forms of consciousness of which the Self consists, and in connexion with which the mechanism of the process cannot be brought into the field of attention.

But on the other hand the only hope of better adjustment to new conditions in our moral or physical environment lies in the possibility of variation;—in a brave modification by Reason of the forms of action inherent in the Self, and

advised by this Self, so to speak, as being accordant with the accumulated experience of each man's special ancestors through the ages past; the only hope of moral advance lies, in other words, in the development of Self government, which on its face seems to be so paradoxical, but which, under the view here maintained, is a necessary experience for one who acquires, or possesses, a capacity, voluntarily (*i.e.*, from the Self), to emphasise the processes of deliberation and reasoning which in the end tend to modify the Self, itself, and in thus modifying the Self giving it opportunity to become better fitted to do its special work in this ever-changing Universe; it is, to quote Dr. Stout[1] again, "control proceeding from the Self as a whole and determining the Self as a whole".

§ 10. As an illustration of the bearing of this conception upon psychological problems, we may consider it in relation to the problem of the relation of Belief and Will which has been brought into prominence by the publication of Dr. James' "Will to Believe". The doctrine there maintained briefly stated is this: "Our passional nature not only lawfully may, but must, decide an option between propositions whenever it is a genuine option that cannot by its nature be decided on intellectual grounds; for to say, under such circumstances, 'Do not decide but leave the question open' is itself a passional decision, just like deciding yes or no, and is attended with the same risk of losing the truth".

This doctrine has aroused much opposition, notably on the ground, as Mr. Dickensen S. Miller puts it,[2] "that such precepts are in effect an attempt to corrupt intelligence, that they aim a deadly blow at the vital instincts of the upright intellect". Here we have Prof. James upholding the view (to use Mr. Miller's words) that "belief is always, because in essence, a matter of the will". On the other hand, we have his opponents holding that belief "is of an essence altogether distinct from will".

In the first place then we have to consider a question of fact. As I have elsewhere argued[3] it seems clear that we always must exert our will whenever we believe: that belief implies a judgment, and that judgment involves a voluntary act: that settled conditions of mind which are often objectively interpreted as belief, are, or may be, conditions of belief, but are not belief proper. We are wont to say, for

[1] *Manual of Psychology*, p. 615.
[2] *International Journal of Ethics*, Jan. 7, 1899, p. 172.
[3] *International Journal of Ethics*, April, 1899.

instance, that the common man believes in the reality of objects in the outer world, because he acts as if he believed; but in truth the conditions of belief alone obtain in such cases. He cannot rightly be said to believe in the reality of these objects until doubt as to their reality, such as has never been raised, is raised in his mind; and then only is it that by an act of will, from within, as we say, his Self casts aside the doubt, resolves the deadlock, and he believes.

This is true even where we act "as if we believe". In such cases it seems to me that in the moment when we act "as if we believed," *in the moment of the act*, we must, and do, believe as we act. In the immediately following moment we may say, "I do not believe," or, "I know not whether to believe or to disbelieve"; but at the moment of the act, belief was bound up in, as an inherent part of, the act.

Now strange as it may appear, I am convinced that the very men who deny this to be a fact—careful and honest thinkers though they be—are actually proving the validity of the position here upheld in the very denial they make. What is it that arouses their objection to believing that the Self may properly influence belief? They deny this plain fact because they think it an attempt to corrupt the intellect. It is because such a doctrine runs counter to the whole present trend of their thought, and because, in their view, it would, if true, weaken their foothold as philosophers and their morals as practical men. They therefore, in taking this very position, cast aside the doubt raised by James's suggestive essay; they "will to believe" that the doctrine is untrue. Whether it turns out to be true or not is not now to the point; the fact to be noted is that they have not as yet proved it untrue. Nevertheless, pending the refutation, which they hold must be forthcoming but which they cannot present, they "will to believe" that it is not true for them.

If then we grant that belief is essentially an act of volition, we perceive that in all cases of willing to believe the process is the same, and that it consists in the appearance from within the Self of some influence which constrains us to resolve in some one direction the conscious opposition involved in doubt. It is not from without, but from within, the Self that proceeds the power to "load the dice".

This, however, does not involve a doctrine of "contingent choice"; it involves no claim that the "dice are loaded" by processes which do not conform to psychological laws. If I am correct in my view as stated above,[1] the Self which

[1] *Cf.* also my *Instinct and Reason.*

"loads the dice" (if I may repeat myself) is but a huge bundle of instincts; or to state it more correctly, it is the psychic correspondent of a complex instinctive system which throbs as a unit, but which is not differentiated by the excessive or emphatic partial activity of any part of the complex system; it is the mass of "feeling" so called by many; it is that part of the moment's conscious experience which we are warranted in describing as the field of inattention.

When, therefore, there arises from within this complex system an influence which determines an act of will, this influence is due to the existence of instinctive tendencies of the most fundamental character, of the most complete coordination, which act without telling us (by attracting our attention) that they are acting, or are going to act. This silent Self, this throbbing, pulsating mass of inattention, is the resultant of our inheritance from the ages, and of only a relatively small increment due to our own experience in this life. It speaks of the experience of all our ancestors; of those who were men, and of that long line of living forms from whom the first of human beings were descended. These racial experiences have impressed upon us apperceptive systems, and impulse series, in which certain forms are implicit. When some new conception presents itself to us in which this form is explicit, then it is that the Self acts: it stands ready to assimilate this new conception, and when question is raised as to its reality, this Self "loads the dice" in favour of the new conception. The existence of this form in the Self thus determines the reality of the conception, its relative permanence; and the conception thus becomes real for us through the influence of the Self.

As I have said above, the Self speaks of the experience of all our ancestors, of those who were men, and of man's long line of progenitors of diverse animal forms. It speaks with impressive force the voice of this racial experience. If it breaks down a hesitancy, a doubt, by determining an act of will, it, in that very fact, raises objections from racial experience to the notion which is overthrown in the willing to believe. This Self says to us: "The elements which are present in the fields of attentive consciousness represent but a paltry array of experiential effects; I who am the resultant of the experience of the ages judge that the belief which is appearing in the field of attention, but which I overthrow, has a dangerous outcome. It may be impossible to present my objection in the field of attention in ratiocinative form, but my experience from the vast aeons of time leads me to

see that the reality, the truth, is on my side; that the statement of the truth emphasised by reason, and which appears in the field of attention, must be modified if it is to accord with this reality of racial experience. This reality is expressed in my act of will, and the doubt, if it recur and persist, should merely serve to emphasise the necessity of this restatement, so that my act of will may appear to accord with the outcome of ratiocinative process."

VI.—DISCUSSIONS.

EXPERIMENTATION ON EMOTION.

It appears to me that the experiments which Prof. C. S. Sherrington adduces under the above title in *Nature* (2nd August, 1900), in order to overthrow Prof. William James's hypothesis of the nature of emotion, fail entirely to accomplish the object he has in view. For the benefit of those who have not read Prof. Sherrington's interesting paper, I will first briefly recapitulate the position.

Two factors are given: one, the emotional condition of the mind, the other, the contractions of skeletal or visceral muscles producing emotional expression. The problem is concerned with the order of the connexion between these two factors, between emotional feeling and emotional expression. Is emotional expression determined by or does it determine emotional feeling, or are the two collateral and concurrent?

Prof. James[1] is doubtless the ablest exponent of the view that the feeling of emotion is determined by the muscular movements of emotional expression. He says: "An object falls on a sense organ, affects a cortical part, and is perceived; or else the latter, excited inwardly, gives rise to an idea of the same object. Quick as a flash, the reflex currents pass down through their preordained channels, alter the condition of muscle, skin and viscus; and *these alterations*, perceived, like the original object, in as many portions of the cortex, combine with it in consciousness and *transform it from an object-simply-apprehended into an object-emotionally-felt.*"

Now Prof. Sherrington's experiments consist in preventing *these alterations* of muscle, skin and viscus from being experienced by the animal; for this purpose he makes the animal almost wholly anæsthetic. He then still observes certain movements of expression and concludes that the animal still feels the corresponding emotions. Hence to his mind, Prof. James's hypothesis becomes untenable. Prof. Sherrington selected a dog of "markedly emotional temperament". By "appropriate spinal and vagal transection," he cut "from connexion with the organs of consciousness the whole of the circulatory apparatus of the body," and removed "the sensation of the viscera and of all the skin

[1] *The Principles of Psychology*, by William James, vol. ii., chap. xxv. London, 1891.

and muscles below the shoulder". "The reduction of the field of sensation," so obtained, caused "no obvious diminution or change of her emotional character." Her anger, joy, disgust and fear remained as evident upon provocation as before. Even when hungry, she refused to eat a plate of dog's meat, showing conflicting emotions of "desire and disgust" in spite of every encouragement given her that she might eat. From these observations the conclusion is drawn that sensations or presentations arising from the muscular activity of emotional expression are not necessary for the development of emotional feeling.

Now Prof. Sherrington, strange as it may seem, appears not to see that all these above-described antics of joy and grief may be performed by a dog who remains throughout incapable of feeling its expressed emotion. Even if it is legitimate to allow the feeling of emotion in a normal dog excited by normal influences, is it not going altogether beyond our tether to assume that a dog, whenever it shows an emotional expression, must necessarily feel the corresponding emotion? An animal may be anæsthetised or not, its cerebral cortex may be present or removed; yet appropriate stimuli will cause its tail to wag, its ears to lie back, its pupils to dilate or its hair to stand erect—all without proof of the accompaniment of the appropriate psychical factor of emotion.

What then is required to prove or disprove Prof. James's theory? The latter himself tells us: "A positive proof of the theory would . . . be given if we could find a subject absolutely anæsthetic, inside and out, but not paralytic, so that emotion-inspiring objects might evoke the usual bodily expressions from him, but who, *on being consulted*, should say that no subjective emotional affection was felt". Unfortunately the dog of Prof. Sherrington's experiments cannot give us this essential information. And so Prof. James's hypothesis remains unaffected.

CHARLES S. MYERS.

VII.—CRITICAL NOTICES.

Les Grands Philosophes.—Kant. Par Théodore Ruyssen, Agrégé de Philosophie, Professeur au Lycée Gay-Lussac (Limoges). Paris: Félix Alcan, 1900. Pp. xi., 391.

M. Ruyssen has undertaken a difficult task, and has achieved it successfully. He has sought to set forth, in a volume of moderate size, the whole philosophy of Kant, and he has guarded against the almost inevitable indefiniteness of so wide an exposition in so small a space by using for the most part Kant's own words. M. Ruyssen endeavours, as far as possible, to avoid discussion about points of interpretation, and thus separates himself from the more scholastic commentators on Kant, while he also bars himself from the method of another set of expositors by declining to make any estimate of the specific value of Kant's system or to show its historical significance. It is not that he is without opinions on these matters or that he minimises their importance; but he sees clearly that within the limits of his book he has quite enough to do in making a summary statement of Kant's leading arguments. M. Ruyssen's work may thus in many respects be compared with Prof. Watson's *Selections from Kant*, although it seeks to cover a much wider ground and not merely selects but condenses the selections. The task of both writers was most useful, but by no means easy. Kant, with his elaborations and repetitions, gains greatly, from the reader's point of view, by condensation and selection. But his repetitions are seldom mere repetitions, and, therefore, it is not easy to select; while his elaborations often suggest problems of interpretation, so that it becomes somewhat perilous to condense. In any case it is a great gain to have French clearness and method applied to the system of Kant by so careful a scholar as M. Ruyssen.

The main line of interpretation which M. Ruyssen follows is much the same as that laid down by Paulsen, in opposition to the views of Schopenhauer, Benno Erdmann and others, whose contention is that the lesson of Kant means the renunciation of all metaphysic as beyond the power of human reason, which can never reach the thing-in-itself. M. Ruyssen's view is that Kant endeavoured to establish the validity both of positive science and of metaphysics, his two unshaken convictions being (1) belief in science and (2) moral faith. "L'intention maîtresse de Kant est . . . d'isoler si radicale-

ment science et croyance métaphysique, que ni celle-ci n'ait rien à redouter des conclusions de la première, ni celle-là rien à craindre de l'incertitude expérimentale et rationelle de la seconde " (p. 67). As regards Kant's intention this seems a perfectly sound position, and it is one which the pure expositor of Kant ought certainly to take. If, however, we ask how far Kant was successful in carrying out his intention, or (what is much the same) if we try to estimate the historical value and significance of Kant's system in relation to others, we may be entitled to proceed upon other lines of interpretation. Every exposition (however much it approaches to being literal) is to some extent a reconstruction, and, therefore, the main characteristics of the interpretation depend to a great extent upon the purpose of the expositor. M. Ruyssen's intention is to give " an inner history of the philosophy of Kant," and accordingly one cannot blame him for dealing with the Kantian system almost as if it stood in isolation, while one is bound to commend the self-restraint with which he limits his criticism " aux discussions indispensables pour atténuer quelques contradictions apparentes ou mettre en lumière certaines transitions peu visibles entre les parties d'un système essentiellement continu et progressif " (p. x.).

This continuity in the development of Kant's system is well brought out by M. Ruyssen. He insists very forcibly on the unity of the critical philosophy, in spirit, in method, and in doctrine, throughout the whole of its range. While recognising certain definite stages in the progress of Kant's thought, he thinks it wrong to regard these as marking fundamental changes of view. Suggestions of the critical philosophy abound in the writings of the pre-critical stage, and one cannot read, for instance, the *Träume eines Geistersehers*, without being struck by such phrases as that (quoted by M. Ruyssen) which requires metaphysics to be " a science of the limits of human reason," and by the equally remarkable references to the independent certainty of " moral faith ". Kant never really adopted an empirical or sceptical position. " A mesure qu'il s'eloigne de la grande route frayée par Descartes et Leibniz pour se rapprocher de l'empirisme sensualiste de Hume et de l'empirisme morale de Rousseau, Kant pose les jalons du chemin nouveau qu'il tracera lui-même " (p. 53). Further, M. Ruyssen, while following in his exposition the second edition of the *K. d. r. V.*, does not regard the differences between the editions as indicating any fundamental changes in Kant's thought, and in the same way he insists on the essential unity of the three *Critiques* with one another and with *Religion within the Limits of Pure Reason.* " Pas plus qu'entre la *Critique de la raison pure* et celle de la *raison pratique* il n'y a solution de continuité entre celle de la *faculté de juger* et les deux précédentes. Elles s'harmonisent par l'unité de leur méthode et l'identité de leurs résultats " (p. 325).

The opening chapter of M. Ruyssen's book is devoted to a brief

but clearly-written biography of Kant, and this is followed by a careful and scholarly account of his various pre-critical writings, which are divided into three groups, those on Natural Philosophy, those on Metaphysics, and those belonging to the empiricist stage of his progress. As the result of his thinking during this period Kant obtained three fundamental ideas which he never afterwards gave up: (1) belief in the certainty of science; (2) the distinction between the analytic and the synthetic procedure of human thought and the conviction that the former, founded on the principle of identity, connects ideas only and not things, that a purely deductive metaphysic or science does not reach reality, that every objectively true judgment is a synthesis founded on experience; (3) the independence and primacy of moral feeling, which feeling philosophy ought doubtless to justify, but which it can neither create nor destroy (pp. 53, 54). Chapter iii. is devoted to an exposition of the *K. d. r. V.*, along with the relevant portions of the inaugural dissertation of 1770 (on the principles of the worlds of sense and understanding) and the *Prolegomena*. If it be granted that it is possible to accomplish this in ninety-four pages, the work is very well done; but it will be more useful to a reader already familiar with Kant, and desiring merely a convenient abstract of the *Critique*, than to one who wishes to obtain a knowledge of Kant's philosophy in an untechnical form. The difficulty of reading Kant, which M. Ruyssen wittily describes, is nowhere greater than in this *Critique*, and consequently the disadvantages of his method of interpretation are specially evident here. Kant certainly repeats himself in a tiresome way, but his repetition is generally with a difference, and we can seldom find one statement which adequately expresses his thought. Consequently, a "skipping" method of exposition, which aims at giving mainly Kant's own words, is apt to increase difficulties rather than lessen them. On the other hand, such an exposition as this may be of considerable value to one who reads it along with the text of the *Critique*. I have noted several passages in this chapter which are specially open to the objections which I have suggested. The account (p. 105) of Kant's attempt, in the second edition of the *Critique*, to prove a necessary existence outside of us from the consciousness of our own existence, seems to me to give the argument in a form which is not complete enough to be conclusive. Again, M. Ruyssen's brief statement regarding the origin of the three great proofs of the existence of God is practically quoted from Kant's own summary of his argument; and yet it cannot be said to be clear or sufficient by itself. Another instance of similar inadequacy occurs in the exposition of "The Discipline of Pure Reason in Relation to Proofs" (*K. d. r. V.*—Ha 589), where M. Ruyssen says (p. 152): "La possibilité de l'expérience demeure l'unique critérium légitime d'une démonstration philosophique. L'unique preuve du principe de causalité, par exemple, est la nécessité d'une détermination dans le temps pour qu'une expérience

se produise." That is perfectly true so far as it goes; but Kant's point is not merely that experience is impossible without determination in time, but that determination in time is impossible apart from the law of causality. "The determination of an event in time, and consequently the event itself as belonging to experience, would be impossible if the event did not come under this dynamical law" (*K. d. r. V., loc. cit.*). This, of course, is a small matter, and it may be that M. Ruyssen regards the omitted point as so self-evident that it does not need to be stated; but I am inclined to think that the passage will not be clear to the majority of his readers.

Apart from this feeling that, probably owing to the exigencies of M. Ruyssen's method, the *K. d. r. V.* has hardly received full justice, one can have little but praise for the way in which the work has been executed. Chapter iv., dealing with the "Metaphysic of Nature," is one of the most interesting and valuable in the book. M. Ruyssen has made full use of the recent commentaries by Arnoldt and Heinze upon Pölitz's edition of the notes of Kant's lectures on metaphysics and the philosophy of religion. In reading this chapter I have been much impressed by the resemblances (though, of course, accompanied by many differences) between Kant's suggestions of a metaphysic of nature and the views of the real Leibniz, as distinct from the Wolffian Leibniz whom Kant had thrown over. It would be interesting to have this fully discussed; but the inquiry would carry us away from M. Ruyssen's book.

Kant's ethical doctrine is expounded in chapters v. and vi. Chapter v. consists mainly of a summary exposition of the *Kritik d. prakt. Vernunft* and the *Grundlegung d. Metaph. d. Sitten*, the two being skilfully combined into a clear and continuous statement, in which, as far as possible, Kant's own expressions are used. Occasionally, as in the case of the *K. d. r. V.*, the exposition is too brief to be adequate; but the deficiency is here less noteworthy and on the whole the statement is admirable. The real difference underlying the superficial resemblance between the ethical positions of Rousseau and of Kant is admirably brought out in a brief comparison between them; and in chapter vi. their views on Education are similarly contrasted. The main subject of chapter vi. is an exposition of the *Metaph. Anfangsgründe d. Rechtslehre* and *d. Tugendlehre*, while some account is also given of various other writings, mostly on the philosophy of history and anthropology. *Der Ewige Friede* and the lecture-notes on Education are also expounded with some fulness in Appendices. M. Ruyssen refuses to regard the former of these as a mere humanitarian dream or (as Stengel and others have recently suggested) as a piece of ironical humour. "Il y faut voir l'espérance d'un ferme esprit qui n'ignore rien des dures conditions de l'enfantement humain et croit que l'avenir, pour être d'ailleurs élaboré par le passé, peut cependant devenir meilleur et plus doux" (pp. 241,

242). In this M. Ruyssen is doubtless right; but one cannot but wish that he had given to the fuller exposition of the *K. d. r. V.* some of the space which is here devoted to the *Rechtslehre* and the *Ewige Friede.*

In chapter vii. the *Critique of Judgment* is expounded and its history is traced in Kant's letters. On Kant's own avowal it was not a part of his original plan; but on the other hand Kant vigorously maintains that the logic of the system inevitably leads to it. Little need be said of the exposition, except that it is carefully done, on the same principles as the other parts of the book, and that its clearness is enhanced by an occasional variation in the order of the parts. As to the relations of the three *Critiques*, M. Ruyssen, as we have seen, maintains that they are one in method and identical in their results. The *Critique of Judgment* does not solve, but rather emphasises, the dualism between nature and freedom. Yet "elle les a en quelque sorte rapprochées. . . . Sans amoindrir le domaine de la connaissance, elle élargit l'empire idéal de la liberté et rehausse encore la primauté de la raison pratique; car elle montre, avec plus de précision encore que la *Critique de la raison pratique*, que le beau, l'harmonieux, le divin même n'ont de sens qu'en raison du moral" (p. 326). This is not altogether a satisfactory conclusion in itself; and yet one cannot deny that it is a legitimate interpretation of Kant.

Kant's philosophy of religion is the subject of chapter viii., which opens with an interesting account of the position of the question in the eighteenth century. There are two main problems, that of evil and that of the relations between faith and reason. As to the former of these M. Ruyssen finds in Hume's *Dialogues on Natural Religion* the influence which detached Kant from the optimism of his earlier years—an optimism derived from Leibniz and Wolff. As regards the question of faith and reason the main historic influences on Kant's mind were, on the one hand, the orthodoxy of pietism and, on the other hand, the rationalism springing from Leibniz and Wolff and passing to Reimarus, Lessing and Herder. From this historical statement M. Ruyssen proceeds to an exposition of the *Religion within the Limits of Pure Reason*, which he interprets as the Kantian solution of the problems of optimism and pessimism, orthodoxy and rationalism, and the chapter concludes with a general summary of Kant's theological position, in course of which the remarkable resemblance between his view and that of Lessing in *Nathan der Weise* is pointed out.

In a few concluding pages M. Ruyssen notes some of the chief features of Kant's philosophy as a whole. "Il fut vraiment, durant quarante ans, le cœur vivant de l'Allemagne pensante, rendant plus pur et plus chaud à ce grand corps tout le sang qu'il en avait reçu" (p. 360). While the most striking characteristic of the system is its richness and variety, its fundamental unity is none the less remarkable, and the diversity of the systems arising out of Kant's philosophy is, according to M. Ruyssen, due to the compre-

hensiveness of his method and the variety in the points of view of his disciples, rather than to internal contradictions in the system itself. That is, it seems to me, a somewhat doubtful proposition; but M. Ruyssen is on surer ground when he maintains that at any rate for Kant himself there was no contradiction: his position was, in his own view, the same from beginning to end.

The book is furnished with a useful chronological table and a well-chosen bibliography and it is throughout an able and scholarly piece of work.

R. LATTA.

La Tristesse et la Joie. Par GEORGES DUMAS, Docteur en Médecine et Docteur ès Lettres. Paris: F. Alcan, 1900. Pp. 426. Price 7 fr. 50.

THIS is the first of a series of monographs in which the author proposes to discuss all the special emotions. It is greatly to be hoped that he may succeed in fulfilling this plan, for the first instalment is distinguished above all other works on the subject by the absence of rhetorical description, by careful workmanship, and by clear consciousness of method. If in places the general theory is somewhat halting, it must be remembered that the author's decisions are in part provisional only, and subject to correction and expansion in later volumes.

Many writers have founded their analysis of emotions upon a comparison of numerous individual cases. This procedure is simple, but dangerous; it can give only average results. The surer way is to study different emotions in the same individual, and that is most easily done in pathological cases. It may, of course, be argued that we cannot conclude from the abnormal to the normal; but Dr. Dumas justly maintains that the disproportion of morbid emotion to its cause and its unusual duration are alike external to its purely affective character, whilst the intensity of physical concomitants differs from the normal only in degree. His general outline of procedure settled, Dr. Dumas discusses two preliminary questions. First, he follows MM. Raymond and Janet in drawing a distinction of great importance between 'emotion-shock' and 'emotion-sentiment'. Secondly, he examines the current views on 'physical' pleasure and pain, coming to the conclusions (1) that if pain is at first merely a sign of over-excitation and parallel to physiological concomitants, it can later itself determine organic changes, and (2) that we must distinguish between active and passive types of reactions to pain, the difference between them being from a purely external point of view greater than that between the active type and the reactions to pleasure. This distinction to types is fundamental for the ensuing discussion, and is undoubtedly valuable. It would, however, have gained in

clearness had the author explained his position with regard to the demarcation of pain proper (*Schmerz*) from 'unpleasure' (*Unlust*). The French language seems at this point to suffer from the same lack of terms as our own.

To his next step the author makes essential the identity in quality of all pleasures and of their opposites. On this point it would be time wasted to argue, for argument on either side becomes mere assertion. It can only be said that the view upheld by Dr. Dumas and so many other writers contradicts ordinary experience, and fails to give any reasons why pleasures, just like colours, should not as such differ in quality; and such a difference would not really invalidate the general arguments as to the conditions of feeling to which we shall come shortly.

Just as in the simple feelings, so also in the more complex affective states we must distinguish a passive and an active type. The passive type of morbid sadness is characterised psychologically, (1) by the absence of 'moral pain'; (2) by a general feeling of physical impotence and a painful cœnæsthesis, these constituting the affective element; (3) by real mental impotence; (4) by 'diminution in the life of relation,' *i.e.* want of interest in surroundings and tendency to isolation. The active type agrees in the last three points, but is distinguished by the presence of 'moral pain' or suffering and by delirium due to and again reacting on this suffering. In joyfulness also an active and a passive type may be distinguished, marked respectively by presence or absence of 'moral pleasure,' but the types run into and occasion one another, and are less noticeably different than in the case of sadness. In general, the characteristics of morbid joy are (1) a general feeling of well-being and power, with altruistic tendencies; (2) real mental power; and if (3) 'moral pleasure' is felt, it excites (4) representations which react upon it and are influenced by psychical activity and the cœnæsthesis; (5) there is also desire of action and of social life, and (6) a tendency to inco-ordination which grows with the intensity of the emotion. The chapters that describe these states are full of interest, but it is impossible to note more than one or two points here. One point is the condition of attention: both in passive melancholy and in intense joy it is 'atrophied,' but whilst in the former it is so weakened as scarcely to exist, in the latter it is so volatile as to be almost useless, being directed '*à tout et à rien*'. This inability to maintain fixed attention in joy is evidence that the increase in sense-acuity, the vivacity of imagination, and the like, are due to true hyperæsthesia; and similarly it is probable that in passive sadness the sensibility is really lessened, though here decisive proof is scarcely to be attained.

Of the psycho-physiological chapter it must suffice to give the main conclusions. Every emotion-shock is accompanied by (1) cerebral vaso-dilatation and peripheral vaso-constriction; (2) cardiac acceleration and arterial hypertension, and (3) respiratory accelera-

tion. With the emotion-sentiments matters are more complicated. Passive sadness is marked by weakened peripheral circulation, slow heart-beat and slow respiration, whilst the active type displays an active circulation and accelerated heart-beat and breath. Now, the characteristics of joy are precisely the same as those of active melancholy, except that in the latter case the excitation is '*une excitation de déprimé*,'—*i.e.*, the heart-beat, though quick, is weak and the respiration shallow—just as, psychologically, the active reactions of sadness are not a true revolt, like anger, but '*une révolte de faible*'. In spite of this difference it is evident that Dr. Dumas's results work powerfully against the sensational theory of emotion, to an extent, indeed, that Dr. Dumas himself scarcely appreciates.

The chapters on 'Psychochimie' and 'Psychophysique,' dealing chiefly with nutrition, weight and temperature of the body, give no unexpected results; in that on 'Psychomécanique' it is worth noting that according to Dr. Dumas the increase and decrease of muscular force in joy and sadness respectively affect movements of extension and movements of flexion alike. This is certainly what one would expect, but it is in opposition both to Münsterberg's results and to the exactly opposite results of other writers, with whom Dr. Dumas does not seem to be acquainted. It is unfortunate that his experiments are so few in number.

Turning now to Dr. Dumas's theory of the conditions and nature of joy and sadness, we learn that the latter goes with the exhaustion of associative functions or the arrest, partial or entire, of habitual and instinctive tendencies. Just as exhaustion is at the bottom of bodily pain, being there due to overexcitation, so too it is fundamental to all kinds of sadness. Joyfulness, on the other hand, goes with moderate stimulation of mental functions and with increased liberty and scope for representative and other habits and tendencies. The presence of excitement, painful or pleasant, is conditioned by the temperament of the individual; the active type reacts more freely because it feels more keenly. Physiologically, the simpler, passive feelings are due, in the case of sadness, to functional arrest and consequent anæmia of the centres, or to an exhausting excitation, determining phenomena of resistance; and, in that of joy, to moderate stimulation with consequent hyperæmia of the centres, the excitation sometimes determining marked reactions.

But what are we to say of the nature of these emotions? Dr. Dumas expounds his view in the light of sensational theories, and his position, though scarcely more than provisional, cannot be called satisfactory. Lange's doctrine he discards, but with that of James he dallies in very inconclusive fashion. His whole line of investigation and especially, perhaps, the fact that he has succeeded in modifying the affective state of his patients by means of drugs leads him to attach great importance to organic conditions; but it is disappointing to find that he has taken no notice of

Stumpf's weighty criticisms of the sensational theory (*Zeitschrift f. Psych.*, xxi., 47). The actual conclusions reached are wavering, if not inconsistent. For the passive types of emotion James' peripheral theory is held to be probably true, but "pleasure and pain in their acute forms are not the effect but the cause of the majority of the peripheral reactions which characterise exuberant grief and joy," and in the active types a central 'sensation' of pleasure and pain is the starting point. This so-called sensation can scarcely be peripheral, not only because we localise moral pleasure and pain in the anterior part of the brain (surely a disputable statement), but more especially because extreme moral pain can occur without any facial reaction. Dr. Dumas therefore reserves judgment, displaying the same kind of inconsistency as that which James displayed in the case of the finer emotions. If pleasures are always qualitatively identical, and pains also, whether bodily or moral, then it is difficult to avoid referring them to the same origin, and surely the passive types of emotion are pleasant and unpleasant in their own degree. If they are, we might derive the feeling of depression, for example, from peripheral sensations, but not the hedonic tone; and if the impossible position were to be maintained that the passive types are toned neutrally or not at all, then it was incumbent upon Dr. Dumas to insert a preliminary discussion of other simple feelings than pleasure and pain. The confusion is largely due to the unquestioning identification of pain and 'unpleasure'; the tone of passive sadness is overlooked because it is not acutely painful. Perhaps Dr. Dumas will make his position more secure in his next work; it is to be hoped, however, that he will find some less equivocal and dangerous name than the "theory of 'cerebral cœnæsthesis'" for the non-peripheral view. Either an index or at least a subdivision of the long chapters into paragraphs with titles would greatly increase the convenience of his work.

T. Loveday.

VIII.—NEW BOOKS.

Manual of Psychology. By G. F. Stout, M.A., LL.D. London: University Correspondence College Press, 1899. Pp. xvi., 643.

The present reviewer, who feels that he owes an abject apology, alike to the Editor and the readers of Mind for the lateness of the accompanying notice, has little hesitation in pronouncing Dr. Stout's *Manual* on the whole far and away the best text-book of Psychology for teaching purposes with which he is acquainted. Among the German Psychologies the admirable *Lehrbuch* of Beneke seems to him to present most points of similarity with Dr. Stout's work, though it labours under the disadvantage of a difficult style, besides being by now somewhat antiquated in its facts, and has never attracted the attention its merits deserve. In English the most serious rival of Dr. Stout's *Manual* as a work at once clear enough to attract the beginner and full enough to provide for all the ordinary wants of the more advanced student is probably the translation of Höffding's *Psychologie*, which is however seriously vitiated by the author's excessive weakness for the formulæ and analyses of Associationism. Among the many merits of the new *Manual* there are two in particular which seem to call for special commendation, the combination of the genetic with the analytic standpoint as the basis of the arrangement of the material and the complete rejection of the old Associationist or Humian analysis of the contents of mind. The matter of Psychology becomes infinitely easier of assimilation when well-marked concrete stages in the development of mental life, such as the sensational, the perceptual, and the ideational stages, are successively dealt with *as* concrete wholes. The analytical arrangement of such works as the *Outlines* of Sully and Höffding, in which the development of cognition, feeling and volition is described separately, inevitably tends to obscure the identical character of the evolution which is being dealt with from the three points of view and to perpetuate, at least in the mind of the beginner, the notion that he is being introduced to three distinct "faculties" or classes of mental states. With Dr. Stout's arrangement, according to which the feeling-tone and conative aspect of each level of mental development are separately treated in immediate connexion with the corresponding cognitive aspect, such a mistake should be impossible to even the dullest pupil. The second point is one of still greater importance, and constitutes the most original feature of the book. It is an immense gain to have adequate views as to the nature of perception, and the character and function of "ideas" put clearly before the student from the first in the place of the crude Humian assumptions of most of our elementary text-books. And students who are by no means beginners will find the grounds for rejecting the Associationist account of perception already brought forward in the author's *Analytic Psychology* restated in the present work with added force and lucidity. With a view to a second edition it might perhaps be suggested that the beginner at

least is apt to find difficulties in the notion of a psychological "disposition" and its relation to modifications of physiological structure which might be removed by a few added lines of explanation. Among minor excellences may be mentioned Dr. Stout's laudable abstention from encumbering his pages with numerical results of experiment which as yet have thrown no light upon questions of principle. The temptation to give Psychology a spurious air of scientific exactitude by the free use of mere figures is just now a serious one, and much credit is due to a writer who successfully resists it.

The one chapter in the book which the present writer has, after repeated perusal, found obscure and unsatisfactory is that on "Body and Mind". The impression that chapter has left on one reader at any rate is that it says either too much or too little—too much to be accepted as an account of such factual concomitance of mental and bodily states as any psychological theory must take for granted; too little to show why the theory of parallelism should be preferred to the older theory of interaction. Dr. Stout seems to admit that the notion of two parallel but unconnected series is finally unthinkable, and needs to be relegated to the position of a working hypothesis. But does he show why, *as a working hypothesis*, the old-fashioned notion of interaction will not serve our turn equally well? The metaphysical monism to which he resorts as the philosophical "explanation" of parallelism, besides being stated in terms of probably intentional vagueness, seems just as well suited to be an explanation of "interaction". If we are, for working purposes, to violate logic as it must be violated by the doctrine of the parallel series, we ought at least not to do so without proved and urgent necessity, and proved and urgent necessity is just what, as it seems to me, Dr. Stout's third chapter fails to establish. If the mental order and the physical are really one and the same, what becomes of the assumption, in psychology, that mind and body, because disparate, cannot interact?

Dr. Stout is usually so accurate in his statements of fact that a reviewer does not readily find any little errors to correct. I would however call attention to a number of oversights on pages 541-543 of the generally admirable chapter on "Self as Ideal Construction". The wording of the last paragraph on page 541 is almost certain to suggest to a reader not otherwise aware of the facts that Anaximenes and the other pre-Socratics are brought forward to illustrate the survival of materialist doctrines of the soul after Plato. The ascription to Heracleitus of the doctrine that the soul is derived from the surrounding "air" is probably erroneous. Air plays no part in the physics of the Ephesian as far as can be shown from the actual fragments. It was probably the "fire" in the world at large that he supposed to be inhaled in respiration; the identification of "what surrounds us" with "air" is a piece of later exegesis. The doctrine of the duality of the soul referred to on page 542 was surely more of a rarity in mediæval psychology than the language used by Dr. Stout suggests. It was always regarded as a heresy by the orthodox philosophers though it had some vogue with the thinkers of the Renaissance period. The quotation from Bacon at the top of page 543 has apparently been misunderstood. Bacon explicitly gives the faculties there enumerated as belonging to the soul as compounded of the rational and irrational elements, as appears from an examination of the context (*De Augmentis*, iv., 3).

A. E. Taylor.

Studies in John the Scot (Erigena). By ALICE GARDNER. London: Henry Frowde, 1900.

How many students of philosophy have read Erigena? and how many could distinguish him accurately from his namesake, Duns Scotus—"of unhappy reputation," as Miss Gardner rather unkindly adds? Certainly Erigena deserves to be studied, if only that we may see how little modern idealism has advanced beyond this keen thinker, who knew some Greek but not much, and lived in the ninth century. Miss Gardner deserves warm thanks for her gallant attempt to rescue a great name from oblivion, and her little volume, which is most carefully and accurately written and amazingly adequate considering its brevity, ought to stimulate many readers to further study. It contains a chapter on the life and times of Erigena, another on his doctrine of God, a third and fourth on the Predestinarian and Eucharistic controversies, a fifth on his view of the final restoration of the world to unity, a sixth on his idealism, and a seventh on his influence in later times. It would have been better if the sixth chapter had been placed second, as it is really the key to everything else. And we should have been grateful for a brief comparison of Erigena to Kant and Hegel, with whom he has much in common, and to Berkeley with whom he has more.

Space forbids us to enter into many details, but probably Miss Gardner will not complain if a brother traveller in these out-of-the-way paths explains how he differs from her in regard to the difficult passage in the beginning of the *De Divisione*, where Erigena lays down his theory of the object of cognition. At the outset he gives four divisions of Nature (*quod creat et non creatur*, etc.), which form in fact the ground-plan of his book. But, before entering on his argument, he finds it necessary to explain what he means by "*is*" and "*is not*". Accordingly he proceeds to state five views of Being and Not-being. The first is that what can be grasped by sense or intelligence (Accidents, Phenomena) *is;* what cannot be so grasped (Substance, God) *is not.* Here it is to be observed he departs in a very curious way from his Neoplatonist authorities, who held that all substances except God were intelligible, and that, therefore, God alone *is not.* Whether Erigena made this remarkable alteration because he differed from the Neoplatonists, or because he did not understand them, is hard to say. The Neoplatonists, like Hegel, identified substance and phenomena, and Erigena appears to do the same. Matter, like Proclus, he absolutely rejects; privation, he says, *penitus non est;* it is not a part of Nature in any sense. The second gives the favourite Neoplatonist view of Nature, as a chain or hierarchy, extending from God to the lowest created thing. In this chain every link except the highest *is* and *is not.* That which is nearer God is unintelligible, *is not*, to all that is below it; that which is farther from God is intelligible, *is*, to all that is above it. A corollary from this is the famous Neoplatonist doctrine of Receptivity. Like his masters Erigena does not by any means accept the average conscience or intelligence as the standard of truth. Some men see far more than others. In the third he states and rejects the vulgar sense of the words *is* and *is not.* But in the fourth he gives as "not improbable" the ordinary Greek view that things *are* when they are comprehended by the pure intellect, and that objects of sense knowledge (genesis) *are not.* The reason why he admits this view as tenable is evident from the fifth distinction in which he accepts the view that evil *is not* while good *is.* Here he falls into a patent contradiction. For if evil is not a substance, and if it is below, not above, intelligence, it *is.* If it *is not* (and in many important points his argument depends on this premiss) it is eternal and divine.

Many other most interesting points are raised by Miss Gardner's volume. Let us touch upon one more. Erigena is perhaps the only author who explains quite clearly what is meant by the *Via negativa*. God is all, but all is not God; God is Love, but Love is not God, because He is more. He is the unity of contradictions (*Motus* and *Status*). Here we have the difference between the Mystic and the Pantheist on the one hand, and between Erigena and his modern successors, Kant and Hegel, on the other. What a field for speculation opens out here! Let us only observe that Erigena, like Dionysius and the Neoplatonists, leaves out the greatest of contradictions, that between joy and sorrow: and this omission makes his work a philosophy and not a religion. Indeed it makes it an imperfect philosophy, because the task of philosophy is to explain and account for the conceptions of religion, and of all these conceptions none goes deeper than that of union through pain.

A Critical Essay on Berkeley's Theory of Perception. By Ikbal Kishen Shargha (Pandit). Allahabad. Pp. 123.

This is a sound inquiry into the main doctrines of Berkeley's philosophy. The author, after shortly pointing out in his introduction the most conspicuous misconceptions of Berkeley's idealism, begins by formulating and commenting on the proofs which the philosopher adduces of his principal doctrine that the sensible world is "in the mind". He then proceeds to what seems to me one of the best parts of his treatise: he discusses the relation of the "idea" to the "mind," a subject regarding which Berkeley contradicts himself. For "he tells us that the idea has a necessary relation to the mind, and is at the same time of opinion that the mind and the idea are two distinct things". One has to choose between these two opinions. The latter is adopted by Prof. Fraser, who, taking Berkeley at his word, asserts it to be wrong to regard the idea as a mode or attribute of the mind—not to mention here Mr. Collyns Simon, who "spent thirty years of his life in trying to master Berkeley's philosophy and to explain it to others," and yet failed, as our author rightly remarks, to produce anything but a fanciful caricature of his system. Our author himself takes the other view, and I think he is right in maintaining that the existence of a necessary relation between the sensible object and the mind is of the very essence of Berkeley's idealism, and that this points to the conclusion that the idea must indeed be regarded as a state or mode of mind; he tries to show why Berkeley saw no inconsistency in his own doctrine, as stated above. Then follows, under the heading "The Idea as Objective," an interesting discussion of the relation of the finite to the infinite mind, that is to say: of the problem whether, according to Berkeley, the idea, as it exists in the mind of man, is the same as it exists in the mind of God. The reality of the sensible world is at issue in this part of the inquiry, which again serves to bring to light conflicting elements in Berkeley's philosophy.

After thus treating, in part i. of his essay of "The Sensible World," the author proceeds to deal, in part ii., with "The Supersensible," and his chapter on "The Cause of the Idea" provides a transition from the one to the other. The answer given by physiology as to the cause of the idea cannot satisfy the metaphysician. To him that answer would amount to the same as if one tried to explain the origin of a building by saying: "Out of the building came the walls, the doors, and the roof; they gathered together and formed the building".

Berkeley never underrates the importance of physiology or any other of the physical sciences which investigate the laws that define the order

of phenomena. Here he completely sides with Hume and his theory of custom. But, on the other hand, he thinks that the *true* cause of an effect must have "power" to produce it, and is, therefore, to be looked for not in the world of phenomena, of "ideas of sense," of matter, of things perceived, where there is no "substance," but in the world of things perceiving, of spiritual "substances," forming the ultimate reality of the Infinite Mind; and mind, in so far as it is "will," is the true cause looked for—a striking approach, by the way, to Post-Kantian speculation! According to Berkeley there are only the two sides of existence just named, and no "third natures," an attitude which he himself, as our author justly observes, greatly impaired in *Siris*, the work of his later years. This attitude is, of course, diametrically opposite to modern agnosticism as represented by Huxley and Spencer, against whom the author tries to defend Berkeley's *Spiritual Substance* in his last chapters.

THEODOR LORENZ.

A Manual of Ethics. By J. S. MACKENZIE. Fourth Edition. London: W. B. Clive, 1900. Pp. xx., 472.

We welcome the fourth edition of Prof. Mackenzie's excellent manual. The chief alteration consists in a new chapter on "The Authority of the Moral Standard," which gives an account of the different sanctions which have been proposed, and shows wherein the moral authority consists. The other changes are unimportant.

Les Philosophes géomètres de la Grèce, Platon et ses prédécesseurs. Par GASTON MILHAUD. Paris: Alcan, 1900.

M. Milhaud is already known to students of Greek Philosophy by his volume of lectures entitled *La science grecque* (1893). The present work, like its predecessor, is based mainly on the researches of Paul Tannery; but it is Plato that forms the centre of interest, not, as in the earlier volume, the "Pre-Socratics". M. Milhaud's aim is to interpret Plato afresh in the light of the fact that he was a mathematician, and he is well qualified for the task, being himself a mathematician and a philosopher. He has produced a book which ought to be read by every student of Greek philosophy; for it at least suggests the solution of what is really the great problem of the subject. No one can help feeling that Aristotle misunderstood Plato, and yet it seems impossible to believe that he should have done so. If M. Milhaud is right, the point at which misunderstanding arose is one that belongs to the province of mathematics. Now Aristotle's mathematical views are notoriously crude, and it would help us very much if we could accept M. Milhaud's thesis.

In an interesting introduction, the influence of Mathematics on Philosophy is discussed. How will philosophers who are mathematicians differ in their attitude towards certain problems from those who are not? The philosopher who is also a mathematician will be a dogmatist (not in the bad sense) and an idealist. He will be more inclined to mechanical than to dynamical theories and he will regard the infinite as real. This introduction is extremely suggestive, and at once puts us at the right point of view for understanding the chief problem of the work.

Book I. gives us the History of Mathematics in the hands of the predecessors of Plato. It is first shown that Greek mathematics was strictly autochthonous and not in any sense derived from Egypt or

Babylon. We are taken in a masterly way through the now familiar evidence—the Rhind papyrus, the ἁρπεδονάπται and the rest—and the conclusion is shown to be unmistakable. There is nothing very new in this part of the work, but it may be commended to those who still have any doubts on the subject. It is now, however, generally admitted that the Egyptians and Babylonians had no mathematics, nor the Hindus either till after the Greek invasion. M. Milhaud then goes on to show how the mathematical knowledge systematised in the elements of Euclid was gradually built up from the days of Thales onwards. In doing this, he makes a critical use of the fragments of Eudemos preserved in the commentary of Proclus, and is careful to avoid the error, into which even Cantor has fallen to some extent, of attributing to the earliest inquirers all the knowledge that was afterwards seen to be implied in their discoveries. The only thing that calls for criticism here is the occasional use of modern symbols. It is, no doubt, quite true to say that the Pythagoreans gave the name of "triangular numbers" to "numbers obtained by the summation of consecutive integers $\left(\frac{n(n+1)}{2}\right)$"; but the Pythagoreans would not have understood such a statement, and it produces an unhistorical effect. The symbols by which we express a truth are not indifferent; for they imply a relation to other truths, which may profoundly affect their significance. On the whole, however, M. Milhaud avoids this particular fault. It is satisfactory too to find that he is no longer convinced by the arguments of Teichmüller and Tannery that Anaximander meant by τὸ ἄπειρον the qualitatively indeterminate. He does not, indeed, find the solution of the difficulty where it clearly lies, in the doctrine of a plurality of worlds, but he sees that there is no evidence for the identification of the "eternal motion" with the diurnal revolution, and that the boundlessness of the primary substance is quite consistent with the sphericity of the οὐρανός. The account given of the Pythagorean view that things are numbers, marks a great advance on most expositions of this thorny subject. It is now admitted that the Pythagorean points or units had magnitude, and all the rest follows. It is quite true that the fact of incommensurability was known to the Pythagoreans, and that it is fatal to their way of regarding all quantity as discrete; but this is just the criticism of Zeno, and, if the Pythagoreans had seen the consequences of the fact that the side and the diagonal of a square have no common measure, Zeno would have had nothing to criticise.

Now, according to M. Milhaud, it was just this fact of incommensurability and the consequent necessity of regarding quantity as continuous that Plato made the centre of his system. This is worked out in Book II. We do not know the details of what Plato taught in the Academy, but we do know that it was mainly mathematical. Freed from all mythical embellishments, the theory of "Ideas" appeared in Plato's later teaching, at least, in a purely mathematical form, and it was this form of it that Speusippus continued to maintain and that Aristotle tried to criticise. And M. Milhaud has actually succeeded, at least to some extent, in lifting the veil of mystery which covers the "Ideal Numbers". The relation of the one to what was called in the school the ἀόριστος δυάς of the great and small, the finite and the infinite, is the point in which the "Forms" are identified with the "Numbers". But—and this is the chief thing to note—this was no mere revival of Pythagoreanism; for the concept of number had undergone a radical transformation by the introduction of the ideas of Continuity and Limit. And this is what Aristotle failed to understand. He had never really grasped the fundamental notions of

the new geometry, and instinctively regarded number as no more than a total of juxtaposed units. Number, he still believed, was always formed by addition; two is formed after one by the addition of another unit. It is a serious misunderstanding, no doubt, and we may hesitate to ascribe it to Aristotle; but it is difficult to resist the force of M. Milhaud's exposition. If he is right, he has at last put us on the way of giving an intelligible account of Plato's later theory of Ideas, and of the fact that Aristotle seems to criticise as Plato's views which we cannot bring ourselves to believe that Plato ever held.

JOHN BURNET.

Zur Analyse der Unterschiedsempfindlichkeit. Von LILLIE MARTIN u. O. E. MÜLLER. Leipzig: Johann Ambrosius Barth, 1899.

The research of which this book is an account may be regarded as a continuation of those of Müller and Schumann, and as designed mainly to test further the theory put forward by them: "Ueber die psychologischen Grundlagen der Vergleichung gehobener Gewichte".[1] Briefly, the theory is this: That if asked to estimate a weight, one innervates the appropriate muscles to an extent judged to be sufficient, and that the dictum uttered as to its weight depends not on sensations of pressure or strain, but chiefly on the rapidity with which the weight rises from the table. The amount of innervation employed is dependent on circumstances, *e.g.*, on the size of the object; whence the common illusion that a pound of lead is heavier than a pound of feathers. In these experiments it would however appear to have been determined largely by the average of the weights employed in each series; or, which happened to be the same thing, by the standard weight with which the variable weights were to be compared, and which was lifted in each experiment; with the consequence that the variable weight frequently gave the impression of 'absolute' lightness or heaviness, more especially if it happened to be the one lifted last, and was therefore the one with reference to which the judgment was expressed.

After describing at length the procedure adopted in these experiments (which were all by the method of right and wrong answers) the authors, in the second chapter, show by examples from their own and other results, that the simple theory of Fechner is inadequate to explain them. According to Fechner, the effects of the differences in time and space order between the liftings of the two weights in each experiment, might be represented by substituting $(D \pm p \pm q)$ for the actual difference, D, between the weights; where p and q are constants, whose sign only depends on the order in time and space of the two liftings. The authors have indeed traced errors of this nature (Fechner's time- and space-errors). It would however follow if this was all, that if with one pair of weights we make an equal number of experiments in each of the four possible time and space orders, the errors p and q should disappear from the average of the results, which, however, is far from being the case.

In the next chapter the consequences of the Müller-Schumann theory are carefully worked out, on the assumption that the innervation given is mainly determined by the standard weight (*Grundgewicht*); and it is shown that there would result a 'General Tendency' to a larger proportion of right answers when the standard weight is lifted first, and consequently the impression of absolute lightness or heaviness, which would most frequently occur with the variable weight, has the best

[1] *Pflüger's Archiv*, 45, 1889, p. 37 ff.

chance of determining the answer, which in the main portions of these experiments referred always to the second weight. This is amply confirmed by the results recorded; but besides this 'General Tendency' to greater success when the standard weight is lifted first, the analysis shows that the number of correct answers also depends on whether the standard weight, G, is less or greater than the variable weight, V, and this to a degree which cannot be accounted for merely by Weber's law. For in this respect observers may be divided into two classes: the Positive Type, who give more correct answers when G is greater than V; and the Negative Type, with whom the case is reversed. It appears that the Positive Type is associated with greater power and energy in lifting; nearly all the ladies taking part in the experiments were of the Negative Type; and in the case of the only gentleman who belonged to it, there seems good reason to believe that he was in a weak state of health from overwork; it being moreover shown that the 'type' generally alters in a negative direction during the course of each day's experiments, presumably from the effects of fatigue.

In the latter part of the book the authors exhaustively discuss the experiments; showing statistically the effects of fatigue, practice, the weights employed, and so on, upon the three kinds of error they distinguish; namely, the Fechner's error, the 'General Tendency' and the Type error.

If I may be allowed a criticism it is that they perhaps hardly emphasise sufficiently the fact that at any rate the two latter kinds of error are dependent upon, if not peculiar to, the particular methods of experimenting which they have adopted; and that Prof. Müller is, perhaps, too severe upon Herr Wreschner for striking out a line of his own in this respect. It is interesting therefore to note that Herr Wreschner's results, even when analysed by Prof. Müller's methods, show in two important respects peculiarities which Prof. Müller regards as anomalous. In the first place, the 'General Tendency' is not observable, and in the second, this is the only case in which Prof. Müller has found the Negative Type associated with a Positive Fechner's time-error.

In saying this, however, I do not wish to imply that the methods adopted by the authors were ill chosen, or that they were wrong in confining themselves almost exclusively to one method. On the contrary, the fact that they chose a method which gives scope to the 'absolute impressions' of weight, and that they investigated the effects of these absolute impressions so exhaustively is just what makes of this treatise so valuable a contribution to the literature of Experimental Psychology.

EDWARD T. DIXON.

Das Grundgesetz alles neuro-psychischen Lebens: Zugleich eine physiologisch-psychologische Grundlage für den richtigen Teil des sogenannten materialistischen Geschichtsauffassung. Von JULIUS PIKLER, Dr. der politischen Wissenschaften, Prof. der Rechtsphilosophie an der Universität, Budapest. Leipzig: J. A. Barth, 1900. Pp. xvi., 254. Price m. 8.

Current theories, according to Prof. Pikler, fail in three ways. They assume reflex action to be the fundamental fact of neuro-psychical life, and try to explain it as such; they assume association to be the simplest and most primitive kind of mental connexion, and try to find a correlative for it; they neglect the really primitive and fundamental nervous processes on which 'vegetative life' depends. The

true problems are to discover the material correlatives of pleasure and unpleasure, the mechanical cause of the movements which maintain the pleasant and reject the unpleasant, and the material correlative of comparison and discrimination. The author's theory is that the reflex-arc is really, not an arc, but a circle: every stimulus tends to produce all possible movements, but that movement gains priority and strength whose reaction upon the central nervous system supports and strengthens the 'constant vegetative nervous process,' such a supporting reaction being subjectively experienced as pleasant. Dr. Pikler has certainly stated important problems, and up to this point his very ingenious theory, though entirely unsuccessful in detail, is worthy of careful consideration. He fails in detail—as, *e.g.*, in his more precise theory of pleasure (p. 233), in his explanation of movements which have a favourable or unfavourable effect only on completion (*'endzweckmässige Bewegungen'*), and in many other points—not least because, as he himself admits, the book has been rushed into print and the most eminent physiologists have been consulted after and not before it was completed. This is still more true of the explanation of comparison and discrimination. Dr. Pikler calmly throws over every kind of localisation, and maintains that "all conscious states are subjective epi-phenomena of the interaction of different movements in the same particle of nervous material". Likeness and equality depend on the similarity and identity of direction of these movements, difference upon their conflict. What the nervous process or 'movement' is Dr. Pikler naturally cannot tell us; to its 'direction'—ever recurrent term—he attaches two or three really distinct meanings; of the 'particle of nervous material' he offers no attempt at explanation. This sort of writing is worse than purely formal; it is liable to mislead. These deviations of outsiders into physiology merit condemnation just as much as psychological theories based on non-psychological data; Dr. Pikler has no idea of the difference between criticism and intrusion. Yet his book, for the sake of its earlier pages and because of the ingenuity exhibited throughout, is worthy of careful perusal.

T. L.

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A. Kowalewski, *Über das Kausalitätsproblem*, Leipzig, O. Mutze, 1898, pp. ii., 121.

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E. Platzhoff, *Ernest Renan, ein Lebensbild*, Dresden, C. Reissner, 1900, pp. xiii., 201.

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C. Stumpf, *Tafeln zur Geschichte der Philosophie* zweite Auflage, Berlin, Speyer & Peters, 1900.

E. Adickes, *Kant contra Haeckel*, Berlin, Reuther & Reichard, 1901, pp. vi., 129.

Nel primo Centenario della Morte di Nicola Spedalieri, Conferenze, etc., Roma, Fratelli Bocca, 1899, pp. 114.

G. Tarantino, *Saggio sulle Idee morali e politiche di Tommaso Hobbes Napoli*, 1900, pp. 144.

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IX.—PHILOSOPHICAL PERIODICALS.

Psychological Review. Vol. vii., No. 4. **J. McK. Cattell.** 'On Relations of Time and Space in Vision.' [Introduction : perception with the moving eye ; the fusion of moving objects. Experiments : colours and brightnesses passed, at known rates, behind a window. Results : (*a*) when objects are moved slowly over a limited visual field, they are not seen one after the other at the place where they are exhibited, but seem spread out over a larger area than can be seen. When successive white or coloured surfaces pass over a limited field of vision so rapidly that the eye cannot be moved while they are in view, the stimuli do not seem to follow one another, but are perceived simultaneously side by side, variously arranged and commingled. (*b*) Large individual differences appear in the perception of the same stimulus under these artificial conditions. (*c*) When the eyes are moved so that the line of sight passes over objects, we have one after another stimulating the same retinal field, but we perceive the objects simultaneously side by side. The different results with the moving eye and with moving objects prove that the phenomena of fusion and colour-vision are cerebral and mental rather than retinal—valuable results, but capable of other systematic interpretations. Especially to be deprecated is the author's appeal to teleology as furnishing a causal explanation.] **R. S. Woodworth** and **E. Thorndike.** 'Judgments of Magnitude by Comparison with a Mental Standard.' [Judgments of weight, length, area. Judgments of comparison with a mental standard do not follow Weber's law ; in such judgments as we ordinarily make in life there are many factors, besides the magnitude of the thing judged, which affect the accuracy of the judgment.] **A. H. Pierce.** 'A New Explanation for the Illusory Movements Seen by Helmholtz on the Zöllner Diagram.' [Criticism of theories of Thiéry, Helmholtz, Judd. Explanation in terms of peculiarities of the movement of stimulations upon the retina : confirmation from rate, excursion, behaviour of the eye in respect to rest, movement and kind of movement, direction.] **M. W. Calkins.** 'Elements of Conscious Complexes.' [We must distinguish : substantive or sensational elements (sensational qualities and intensities) ; attributive elements (affections) ; and transitional elements. The first predominate in the percept and the image ; the second in emotion, belief, volition ; the third in judgment, recognition, memory, conception.] Discussion and Reports. **H. H. Bawden.** 'The Functional Significance of the Terms "Sensory" and "Motor".' [The customary distinction between the sensory and the motor aspects of the organic circuit is arbitrary. "It furnishes us with no psychological differentia at all, because the attempt is made to make the distinction one of content rather than of function. But viewed simply as functional phases of the process of adjustment or co-ordination, the distinction (*sic !*) has a positive value." Where this antithesis is not implied, 'kinæsthetic' should replace 'motor'.] **C. K. Wead.** 'Dr. Meyer's "Elements of a Psychological Theory of Melody".' [Critique of Meyer's doctrine of

relationships. Historical sketch of theories; directions for reading.] Psychological Literature. New Books. Notes.

PHILOSOPHICAL REVIEW. Vol. ix., No. 4. **J. Sully.** 'Prolegomena to a Theory of Laughter.' [General sketch of theories; insistence on the complexity of the phenomena. Critique of Lipps' theory. Immediate apprehension of the comical.] **J. G. Hibben.** 'Practical Procedure in Inference.' [Discussion of the canons of inference which provide a working method in ordinary reasoning. Instances of syllogisms, formally faulty, really valid. "Every inferred element may be referred to a given system whenever it is recognised that the element in question is essential to the integrity of that system": instances from the logic of analysis, of identification and of elaboration. Variations in logical force; possibilities of valid inference from foregone assessments of logical value. Educational significance of a qualitative as against the quantitative canon.] **A. Lefevre.** 'Butler's View of Conscience and Obligation.' [For Butler, moral discrimination has both a cognitive and an affective aspect. Conscience is both an intellectual reflexion and an approval and disapproval; and although the discernment of right or wrong is a *prius* to the feeling, both terms are essential. Examination of the objections (*a*) that Butler is guilty of a circle in defining: "we disapprove immoral actions, and immoral actions are those which we disapprove"; (*b*) that his treatment of ethics is purely statical, lacking all idea of growth; and (*c*) that he uses God as a *deus ex machina* to explain morality. The criterion of morality is rationality, though not in Kant's sense. "Virtue is not bare logical consistency, but self-consistency; and vice is not bare logical contradiction, but self-contradiction." Butler thus anticipates self-realisation.] **H. M. Stanley.** 'What Constitutes a Thing?' [Physics "points to the thing as temporal-spatial appearance of correlated activities; evolutionary psychology points to the thingness of the body as the appearance of correlated psychical activities". "The suggestion of science to philosophy is that the totality of things in time and space are appearances of a dynamism physical and psychical, an activity which in part is mere energy, whose determining quality is yet unanalysed, but in part is the will effort of the struggle of existence in organisms."] Reviews of Books. Summaries of Articles. Notices of New Books. Notes.

AMERICAN JOURNAL OF PSYCHOLOGY. Vol. xi., No. 3. **E. B. Huey.** 'On the Psychology and Physiology of Reading (I.).' [(1) Eye movements. Method of direct registration of eye movements: *cf.*, Huey and Delabarre, *American Journal*, July, 1898. The eye moves line by line, forward in quick jerks, backward in an unbroken sweep. (2) Speed of eye movements. The forward movement occupies a constant time, irrespective of the arc traversed. The backward movement has a small *m. v.* whether for time or extent. (3) Reading pauses. The times are very variable. Comparison with the reaction-time of the eyeball to word stimuli. The reading pause is shorter: partly because of associative expectancy, partly because of peripheral prevision. (4) Word perception and extent of the reading field. Lengths of reading matter correctly read on exposed cards, to right and left of the fixation point, without context, and with context to within 2 cm. of the fixation point.] **J. W. Slaughter.** 'Disturbances of Apperception in Insanity.' [Attempts to apply the recent doctrine of apperceptive 'systems' to the study of delusional insanity.] **E. J. Swift.** 'Sensibility to pain.' [Correlation of the pain limen (temporal algometer) with age, sex, mental ability and mental fatigue.] **G. E. Partridge.** 'Studies in the Psycho-

logy of Alcohol.' [(1) Intoxication among primitive and civilised peoples and among animals. (2) The state of intoxication: all drugs in common use are stimulant-narcotics. The pleasure of the state is due in part to the wide range of emotional tone. (3) A study of cases of inebriety. (4) Effect of intoxication upon literature and language. "No other thing except the sexual relationship has made a deeper impression upon the popular language." (5) Analogues of the intoxication impulse: animal plays, outbursts in primitive peoples and in civilised adolescence. (6) Theories of the impulse: sin; craving for relief from pain, etc.; diseased appetite; animal lust; acquired taste; secondary instinct; instinct to intensify consciousness; desire to change relation of common sense to individual sense; instinct which is a by-product of human evolution. (7) Outline of new theory: the impulse is "one form of expression of a general instinctive tendency, which has developed in the race as an aid to mental growth". This tendency is that "to seek intense states of consciousness". Intoxication, as an expression of the tendency, has been favoured by the assistance it gives to the social consciousness. We must also take into account the narcotic effect of intoxication, and the impulse in certain societies to revert to a *less* intense form of life. (8) Experimental: the effect of small doses of alcohol upon muscular and mental ability. Addition is quickened to the end of the second hour; reading, writing and muscular action show a period of quickening followed by retardation.] **G. M. Whipple.** 'Two Cases of Synæsthesia.' [Record of exhaustive laboratory tests. The questionnaire method is inadequate. Variation is great, even in the same individual. The determination of genesis is always difficult: here it proved to be impossible. All that can be said is that the secondary sensations may be conjoined directly or indirectly (by way of organic sensation) with the primary. Generalisation is therefore to be avoided (critique of Bleuler and Lehmann). Notes of taste photisms, and of pain, pressure and temperature phonisms.] **I. M. Bentley.** 'The Synthetic Experiment.' [Experimental analysis may be tested by experimental synthesis. Discrimination of the synthetic perception from the 'illusion'. Types of experimental synthesis: Kirschmann's lustre, Wundt's reflexion, emotion (especially on the James-Lange theory), action (the reaction experiment). The perception of liquidity: analysis, and progressive attempts at synthesis. "The first step was the bringing together of pressure and thermal conditions, in the simplest, though the most artificial way. . . . The actual substance used made little difference, so long as it brought together the essential elements in the necessary mode of combination. Having built up completely our perception, we turned to Nature for a hint as to refinement of method. . . . Taking from her the ingredients which our previous experiments had shown to be essential, but rejecting her superfluous ingredient, 'moisture,' we got the neatest synthesis so far obtained."] Psychological Literature. Notes.

International Journal of Ethics. Vol. x., No. 4. **Mary A. M. Marks.** 'The Treatment of Subject Races.' [A plea for a more sympathetic treatment of subject races, particularly those of India. The relation of conqueror to conquered is essentially demoralising. The Indian famine is due to our mismanagement, and warns us to pause in our imperialism.] **H. E. S. Fremantle.** 'Liberty and Government.' [What are the proper boundaries of individual liberty? *Laissez-faire* which was provoked by overgovernment in the past, is theoretically indefensible. Mill and Spencer criticised. The true principle is to produce a rich individual nature in all the citizens. This principle may be extended to international relationships.] **J. S. Mackenzie.** 'The

Source of Moral Obligation.' [Indifference to the question, Why are we bound to do right? is only suitable to an Age of Faith; not to the present Age of Inquiry. The need of answering the question is forced upon us by the new problem of imperialism. It is antiquated to regard the state or God's will or conscience as the source of moral obligation. The true source is the demand that human powers should be completely realised. Imperialism is only justified so far as it helps this.] **W. G. Everett.** 'The Relation of Ethics to Religion.' [While the source of morality is in man's social relations, that of religion is in his relation to cosmic forces which produce in him the idea of infinite power. The moral element in religion is of human growth. Morality, though significant for metaphysics, must be interpreted unmetaphysically. Religion develops through ritual and dogma into morality. Theoretically, religion is based on ethics. Religion can never be merged in morality.] **H. Davies.** 'The New Psychology and the Moral Training of Children.' [The new psychology in helping us to understand the child's mind is extremely valuable for education. It frequently, however, commits the mistakes of (*a*) underestimating the complexity of the child's mind, (*b*) failing to do justice to his ethical nature, (*c*) perverting the ethical aspect of child-training.] **M. Jastrow, junr.** 'The First International Congress of History of Religions.' [Sketch of the work done in this field by the French. Programme of the Congress at Paris in connexion with the Exhibition.] Discussions by **J. M. Robertson** on 'The History of Freethought,' and by **G. D. Ritchie** on 'Dr. Mackintosh and Intuitionalism.' Book Reviews.

Revue Philosophique. No. 10, October, 1900. **E. de Roberty.** 'Morale et Psychologie.' [Sociology must not be confounded with biology on the one hand or psychology on the other. It is concerned with the transmutation of the biological manifold (the race) into a supra-organic unity (the community) and with the metamorphosis of organic unity (egoism) into a supra-organic multiplicity (altruism). It is, in fact, identical with ethics.] **G. Milhaud.** 'Les lois du mouvement et la philosophie de Leibniz.' [Traces the influence of Leibniz' study of physics on his metaphysical theory.] **Novicow.** 'Les Castes et la Sociologie biologique.' [An answer to M. Bouglé's article: 'La Sociologie biologique et le Régime des Castes' in the April number of *Revue Philosophique*.] **A. D. Xénopol.** 'Les Sciences naturelles et l'Histoire.' Notes et discussions. Revue critique. Analyses et comptes rendus. Revue des périodiques étrangers (Mind). No. 11, November, 1900. **H. Taine.** 'De la Volonté: Fragments inédits.' [A fragment of a treatise on psychology. The main headings are: (*a*) Conflit des Tendances, (*b*) La Tendance fixée, (*c*) Influence de la Tendance fixée.] Les Congrès internationaux de 1900. Correspondance. Revue des périodiques étrangers. No. 12, December, 1900. **Murisier.** 'Le Fanatisme religieux: Étude psychologique. Bos (Camille). Contribution à la Théorie psychologique du Temps.' [Our perception of time is based on the immediate intuition of the rhythmic vibrations of the nerve-elements.] **Palante.** 'Le Dilettantisme social et la Philosophie du "Surhomme".' [Both are forms of social nihilism; but while the former protests against society in the interest of the instinct of beauty, the latter does so on behalf of the instinct of grandeur.] Revue générale. Analyses et comptes rendus. Notes et documents. Revue des périodiques étrangers.

Revue Néo-Scolastique. No. 25. **D. Mercier** ('Le bilan philosophique du XIX^e^ siècle') passes in review the theories of the traditionalist, eclectic, positivist, and other schools of thought of anti-metaphysical

bias. He points out that even when positivism was at the height of its popularity the claims of metaphysics were allowed by such men as Von Hartmann, Lotze, Paulensen, Vacherot, Janet, and others. He quotes Wundt as admitting that Aristotle's view of the soul as "the first entelechy of the living body" succeeds better than other psychological theories in accounting for the facts of experience, and calls attention to the argument recently employed by Richet in favour of final causes. **C. Piat** ('La Substance d'après Leibniz') maintains that the theory of Leibniz is a return to the doctrine of substantial forms, for with Leibniz, as with Aristotle, substance comprises two essential co-principles, of which one is active and the other passive. But, as restated by Leibniz, the theory acquires a new significance. The extension of bodies is no longer an absolute property; it exists only in thought, and is purely phenomenal. Form is a force with the distinctive qualities of perception and appetition. Matter, as distinct from extension, properly so called, is an internal limit of activity. **G. Legrand** ('Deux Précurseurs de l'Idée sociale catholique') gives De Maistre the credit of having anticipated Taine in describing as the two fundamental errors of the French Revolution the legislation for "man in the abstract," and the supposition that it is possible by means of legislative decrees to establish off-hand institutions that will endure. The fault apparent in De Maistre's writings is an excessive liking for deduction. In the domain of politics and sociology the inductive method ought to have the preference. De Bonald, with many excellent qualities as a thinker, was inclined to combat extremes with extremes. He is unable to challenge Rousseau's doctrine of the sovereignty of the people without advocating an exaggerated view of the authority of the State. He cannot oppose the extreme theory of individualism without unduly laying stress on the importance of society. But, with all their faults, De Maistre and De Bonald may claim the merit of having restored those fundamental principles of the Christian social order which the Revolution had attempted to sweep away.

Zeitschrift für Psychologie und Physiologie der Sinnesorgane. Bd. xxiii., Heft 1 und 2. **F. Schumann.** 'Beiträge zur Analyse der Gesichtswahrnehmungen.—1. Einige Beobachtungen über die Zusammenfassung von Gesichtseindrücken zu Einheiten.' [Experimental psychology must progress slowly, because there is much preliminary (methodological) work to be done, and because introspection is inadequate. Experiment, however, comes to the aid of introspection; and it is on the ground of introspective data that progress must now be looked for. (1) Instances of involuntary and voluntary grouping, of more and less intimate connexion of parts, etc., in various forms of visual perception. (2) Various meanings of 'unity'. It may mean approximation to singleness of impression; the persistence with which the complex as complex forces itself upon the attention; or influence as a whole upon ideational reproduction. The analogy with tones and tonal complexes. Unity as a form-quality (positive ideational contents: von Ehrenfels) and as an ultimate characteristic of complexes of elements.] **F. Kiesow** und **M. Nadoleczny.** 'Zur Psychophysiologie der Chorda Tympani.' [Experiments in two cases of otitis med. purulenta chronica. Confirmation of the view that the taste fibres for the anterior two-thirds of the tongue (from the peripheral end of the reg. fol. to the extreme tip of the tongue) must be contained in the chorda tympani. Stimulation of the central end of the chorda in the middle ear gives rise to a sour, metallic-sour or salt sensation in the region named. Observations on sensitivity to pressure, temperature, and pain.] **H. Munk.** 'Die

Erscheinungen bei kurzer Reizung des Sehorgans.' [(1) Colourless stimuli. The appearance of a threefold image is conditioned solely by the brightness-difference between centre and field; if this is diminished the phenomenon, though vacillating, is continuous. The effect of the brightness-difference is shown in the later occurrence of an increased contrast; if it be sufficiently diminished there is but one image. The contrast arises at a relatively early stage of the curve of fall; it is much stronger than the contrast during stimulation; it is separated from the stimulus by a contrastless interval. If a negative image is seen it comes after the positive images. (2) Coloured stimuli. The complementary phase is conditioned by the brightness-difference between centre and field; if this is diminished the coloured image rings off without colour change; the complementary image is positive. Contrast within a chromatic special sense is not able to evoke a complementary phase. If a negative complementary image is seen it comes after the positive phases.—Suggestions towards an explanation, in terms of Müller's theory of visual sensation.] **M. C. Schuyten.** 'Ueber das Wachsthum der Muskelkraft bei Schülern während des Schuljahres.' [Gain during ten months; monthly increase; negative results of the month of March; comparison of girls and boys; slow recovery of girls from the March effect.] **J. McK. Cattell.** 'Die Wahrnehmung gehobener Gewichte.' [Reply to Müller.] Besprechung. [**S. Witasek.** 'H. Münsterberg's *Psychology and Life.*' Literaturbericht. Heft. 3. **J. von Kries** und **W. A. Nagel.** 'Weitere Mittheilungen über die functionelle Sonderstellung des Netzhautcentrums.' [An inquiry prompted by the recent work of Tschermak and Shermann. Experiments with dichromatic and trichromatic eyes show that there is a central field for which the brightness-equations of brightness-adaptation hold after the longest periods of darkness-adaptation. The field is somewhat longer (88-107′) than it is high (81′): the position of the point of fixation within it is not central. Theoretical discussion.] **W. Thorner.** 'Ueber objective Refractionsbestimmungen mittels meines reflexlosen Augenspiegels.' **J. Kodis.** 'Einige empiriokritische Bemerkungen über die neuere Gehirnphysiologie.' [Loeb and Bethe maintain that "the lower animals, up to those which possess an associative memory, have no consciousness, and must, therefore, be considered as mere mechanisms". Critique of this position, in terms of Avenarius' system. The untenability of a dualism; the equivocal use of 'consciousness'; the classification of experience (as characters and elements, things and thoughts, sensations, perceptions, and ideas). The fallacy of 'introjection'. Conclusion: the reduction of the lower animals to automata is due to a confusion of the mechanical and amechanical standpoints; and memory is not a mechanical (or objective) criterion. We must be content to describe, as physics does, and cease to strive for explanations.] Besprechung. '**O. Pfaender.** 'G. F. Stout's *A Manual of Psychology.*' Literaturbericht. Heft 4. **L. Steffens.** 'Ueber die motorische Einstellung: experimentelle Beiträge.' [An important paper, of which only the principal results can be outlined here. Introduction: confirmation of Müller and Schumann's theory of motor predisposition by experiments upon animals. (1) A motor predisposition is not transferred to the corresponding organ of the opposite side of the body. (2) The behaviour of concurrent predispositions: the rapid fall of predisposition, as indicated by the 'principal' experiments carried out to test it, is illusory, due to these experiments themselves; motor dispositions of different age fall or ring off side by side just as do variously aged reproductive tendencies of the psychical memory. (3) Distribution of a constant number of predisposi-

tion experiments over a time period of varying length: if the time interval between the last predisposition experiments and the principal experiments (made to test predisposition) is not too short, a wider distribution of the predisposition experiments leaves a stronger disposition behind. (4) It is true of motor predisposition as it is of psychical memory that of two regular modes of distribution the wider is the more favourable to retention. Given sameness of age, a motor predisposition rings off the more quickly in time (absolutely taken), the stronger it is.] Literaturbericht. Heft 5 und 6. 'Bibliographie der psychophysiologischen Literatur des Jahres, 1898.' [Gives 2746 titles, as against the 2558 of the *Psychological Index* of March, 1899.]

Philosophische Studien. Bd. xvi., Heft 1. **N. Alechsieff.** 'Reactionszeiten bei Durchgangsbeobachtungen.' [The investigation has two purposes: to analyse the different types of reaction, both under ordinary conditions (light pendulum) and in transit observations (red point on white field), and to ascertain the most favourable psychophysical conditions for astronomical transit work. (1) Every reactor has a 'natural' (central, mixed) reaction form, from which the sensorial and muscular (or complete and shortened) forms are variations. (2) The best observations are made if the reactor fixate the cross-lines of the telescope, and wait for the sense impression to pass from indirect into direct vision. (The star moves from 10° to 14° in the 1 sec., and the extent of the field is about 28°.) The time from entrance of the star into the field to transit must not exceed 1-1·5 sec. The reaction must be made "in the exact moment of perception of the transit". The principal disturbances come from lack of practice, lack of uniformity in the form of reaction employed, and eye movements.] **W. Wundt.** 'Zur Kritik tachistoskopischer Versuche.'—II. [Detailed (and successful) reply to the paper by Erdmann and Dodge, in the *Zeits. f. Psych.*, xxii., 241 ff.] **M. K. Smith.** 'Rhythmus und Arbeit.'—I. [First part of an inquiry into the effect of rhythm upon the quantity and quality of work, physical and mental. Distinction between forced and natural rhythms. Plan of experiments: ergographic tests, rhythmical writing, the effect of rhythm on the judgment of lifted weights, on memory, and on 'visual learning': the series becomes progressively less physical and more purely mental. Results: (1) the ergographic tests failed, since the observers fell into a rhythm, whether prescribed or not. (2) Seven series of writing tests gave results bearing on the difference between quality and quantity (shortening of total time, increased rapidity, promptitude of execution) in all kinds of work. Rhythm affects the latter characteristic. Besides the detailed conclusions from the series, the author notes the advantage of unification of children's work; the gain in accuracy and regularity; the saving of time; the disciplinary value of rhythm; and the musical value of the development of rhythmical susceptibility. (3) Weight experiments: procedure and apparatus. Eight experimental series.]

Vierteljahrsschrift für Wissenschaftliche Philosophie. Jahrg. xxiv. Heft 4. **E. Marcus.** 'Versuch einer Umbildang der Kant'schen Kategorienleher.' [Kant was wrong in basing his table of Categories on the forms of judgment. The test of the completeness and organic unity of such a table lies in its power to enable us to reconstruct the general plan of experience in its completeness and organic unity. The writer holds that the Kantian table is not complete, that it is not fully systematised, and that at certain points it substitutes complex and derivative for simple and primitive conceptions. He proposes and defends a table drawn up by himself.] **Joseph W. A. Hickson.** 'Der Causal-

begriff in der neueren Philosophie.' [Hume is right in attacking the conception of efficiency or power as a tie between cause and effect. He is also right in denying that the nature of the effect can be determined in advance by mere analysis of the nature of the cause. But he is wrong in denying all intelligible connexion between cause and effect.] **Raoul Richter.** 'Friedrich Nietsche.' [An obituary notice: enthusiastically appreciative.]

Archiv für Systematische Philospohie. Bd. vi. Heft 4. **J. Bergmann.** 'Die Grundsätze des reinen Verstandes.' [Discusses the principles of Identity and Contradiction as respectively criteria of true and of false propositions. As applied to real existence these principles are mere tautologies. But there are two *real* principles corresponding to them—that of Sufficient Reason and that of Repugnance. Whatever is truly affirmed or denied of an individual thing has its sufficient reason in the essence of that individual thing. This proposition is explained and defended, and the conception of essence and accident thoroughly examined. An important article.] **Hans Kleinpeter.** 'Zur Formulierung des Trägheitsgesetzes.' ["It is possible to define a system of co-ordinates and a normal motion, in relation to which all bodies move uniformly in a straight line, when deviation from this norm is not unideterminately definable in accordance with our other physical assumptions."] **Max Dessoir.** 'Beiträge zur Aesthetik.' Discusses the poetic representation of the psychical life of individuals. This involves sympathetic realisation, but at the same time a distinction between the artist himself and the imagined person. The sympathetic realisation is heightened by appropriate organic sensations and motor activity. Poetic experience is not *observation* but an apprehension which is complete because it is not limited by interest in ulterior ends. Poetic construction proceeds from the obscure scheme of a total personality to determinate detail.] **F. Tönnies.** 'Jahresbericht über Erscheinungen aus den Jahren, 1897 and 1898.' **B. Bosanquet.** 'Systematic Philosophy in the United Kingdom in 1899.'

Rivista Filosofica. November, 1899. **L. Credario.** 'L'opera della Società per la Storia dell' educazione e della scuola tedesca.' **C. Cantoni.** 'Sul concetto e sui carattere della Psicologia' (2a. parte). **A. Piazzi.** 'A proposito di una recente pubblicazione pedagogica del Prof. Michele Kerbaker.' **G. Rossi.** 'Vico nei tempi di Vico.' **G. Vidai.** Intorno al "Fondamento della Morale".' January, 1900. **N. Fornelli.** 'Studio di Psicologia scolastica.' **E. Sacchi.** 'Sulla teoria platonica del delitto e della pena.' **A. Piazzi.** 'Il liceo moderno.' **E. Juvalla.** 'Sul giudizio della condotta morale.' March, 1900. **C. Cantoni.** 'La corrispondenza di due filosofi.' **A. Piazzi.** 'Il liceo moderno.' **A. Groppali.** 'Di un opera di G. Marchesini.' **A. Faggi.** 'Per la Psicologia dei sentimenti.'

X.—NOTES AND CORRESPONDENCE.

To the Editor of "Mind".

A few words from me seem needful to correct a profound misapprehension of my views expressed in your last number by Dr. Tolver Preston. He represents me as regarding our consciousness of Space as evolved from our consciousness of forces. His words are:—

> "In his *Principles of Psychology* . . . Mr. Herbert Spencer ventures to suggest a particular theory, which makes Space and Time the resultants of a transformation passed through, where force is therefore (by implication) concerned, just as if it were a case of colour or sound. . . . If Space and Time be not resultants of force-action; may not this constitute some reason for regarding them as absolutes."

I am amazed by these statements. Throughout the chapters in which I have treated of the conceptions of Space and the Space-attributes of Matter I have in varied ways represented our Space-consciousness as resulting from our experiences of the *relations* among forces. In my view our Space-consciousness is an abstract from our experiences of all relations of co-existence and includes forces in no other way than as being the terms of the relations.

The remainder of Dr. Preston's criticisms are pervaded by derived misapprehensions.

Herbert Spencer.

Brighton,
2nd December, 1900.

UNIVERSITY COLLEGE, LONDON.

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MIND

A QUARTERLY REVIEW

OF

PSYCHOLOGY AND PHILOSOPHY.

I.—CURRENT SOCIOLOGY.

Essai historique et critique sur la Sociologie chez Auguste Comte. Par FRANCK ALENGRY. Paris, 1900.

Social Laws: an Outline of Sociology. By G. TARDE (translated). London, 1900.

Les Transformations du Pouvoir. Par G. TARDE. Paris, 1899.

Social and Ethical Interpretations in Mental Development. By JAMES MARK BALDWIN. Second Edition, Revised, with Additions. London, 1899.

The Philosophical Theory of the State. By BERNARD BOSANQUET, London, 1899.

The Elements of Sociology. A Text-Book for Colleges and Schools. By FRANKLIN HENRY GIDDINGS. New York, 1899.

BY SYDNEY BALL.

THE claims of Sociology 'as such' to be recognised as an accredited science are being advanced at the present time with an energy and an assurance worthy of its eponymous 'Founder'. Is it really a science, or is it more than a name for a science which may or may not some day come into existence? Prof. Giddings has no misgivings: he is compelled to acknowledge that Sociology has so far been a substance of scientific things hoped for rather than realised, but he assures us that "there is every reason to believe that the time has come when its principles, accurately formulated and adequately verified, can be organised into a coherent

theory": when, in other words, Sociology may be exhibited as "a definite and concrete body of knowledge to be presented in the class-room and worked over in the seminarium". These are brave and even startling words, and they certainly merit the attention of social students. Whether Prof. Gidding's own treatise, in its larger or smaller form, confirms the expectation which he raises, I do not propose to inquire in detail. I cannot think, however, that it is specially adapted to remove the deep-seated suspicion of the layman that Sociology is rather a word which denotes a great group of problems waiting for solution than any compact and systematic body of doctrine, and that, as Prof. Wallace puts it, "works with the title of Sociology are rather essays to find the handle of a science than real exhibitions of its systematic content". Certainly, if one applies Comte's own tests of the real establishment of a positive science to the 'Sociology' that exists,—the tests, that is, of Consensus and Continuity (to say nothing of Prevision), the results are discouraging and even bewildering. Prof. Giddings insists that Sociology has a province "as definite as that of any science": the realisation of its logical possibilities, he tells us, is "at least a little nearer than it was when Mr. Spencer wrote his awakening chapter on 'Our Need of It'". But to the student of current sociological literature there seems to be a conspicuous absence of agreement as to the principles, province, or method of the science; while the predictions of sociologists carry disagreement to the verge of incompatibility. *Quot homines, tot sociologici:* Vanni distinguishes and criticises at least ten different, if not disparate, definitions of Sociology, and Barth treats Prof. Giddings' *Principles* as one among many samples of 'dualistic Sociology,' which is in its turn one among many species of sociological systems. Barth himself (who may be regarded as the first systematic historian of the subject) identifies Sociology with the philosophy of history, and is therefore of opinion that Prof. Giddings and other sociologists have missed the royal road of the historical method. Apart from the merits of his own philosophy of history, Barth seems to be in this respect truer to the original Sociological tradition; for it is not a little remarkable that the prevalent method of Sociology should have become psychological, in view of the fact that the founder of Sociology as a 'positive' science expressly excluded psychology from its method. The distinctively Comtist note is, indeed, difficult to find in modern Sociology, which is at once psychological, abstract, and theoretical. The only element in the original conception that seems to

be left is the formal recognition of Sociology as a positive science, having for its subject-matter the study of social phenomena as a whole: formal, because Comte's [1] hypothesis that social phenomena are subject to natural laws, admitting of rational prevision, seems to suggest both more and less than what is attempted by the modern sociologist as such.

The change that has come over the conception and method of the science gives to Dr. Alengry's review of the Comtist Sociology a somewhat antiquated air. Dr. Alengry seems to accept the view that Comte has endowed Sociology with its principal means of existence in his conception of "*des lois nécessaires et proprement sociologiques, découvertes par une méthode spéciale: l'histoire*". These are *des germes impérissables que la Sociolgie après lui allait bientôt féconder*. Dr. Alengry assumes, in effect, that progress in Sociology must be progress on the lines laid down by Comte, and contents himself with criticising Comte in the light, not of any change that has come over the method, but of the method Comte himself prescribed. Comte, we are told, has given undue prominence to the laws of succession of social phenomena as compared with the laws of their co-existence: his historical canvas is too large, and he has neglected the comparative and statistical method. Still, Comte's method (we are given to understand) has only to be modified and corrected to be effective: Comte, in effect, 'discovered' the fundamental principles of social science; he definitely annexed *le règne social* to 'the realm of nature,' and the rest is simply a matter of detail. Dr. Alengry, from the Pisgah-height of Comte's achievement, ventures even to survey the promised land, and looks forward to the establishment of a social science which shall be to statesmen what astronomy is to pilots or physiology to doctors (p. 496). But he seems unaware that Sociology has become a psychological science,[2] and that its statements are being more and more confined to the indicative mood. The value of his study, accordingly, consists entirely in the light it throws upon the evolution, not of Sociology, but of Comte's idea of it: and for this purpose Dr. Alengry has drawn largely upon Comte's private correspondence. He has also made some attempt—certainly not a particularly instructive attempt—to affiliate Comte to previous thought: but he has not taken

[1] Cp. Il y a des lois aussi déterminées pour le développement de l'espèce humaine que pour la chute d'une pierre (*Corresp. avec Valat*, p. 139).

[2] As Mill intended: but, according to Dr. Alengry, Mill has added nothing to the 'thought of the master': in fact, so far from fortifying or completing the conception of social law, he has really enfeebled it (pp 490, 491).

him as far back as the Seventh Book of the *Republic* of Plato: and yet Plato is certainly entitled to no uncertain place among *les précurseurs* of Comte, though Comte himself, I believe, did not carry his direct lineage back beyond *l'incomparable Aristote.*

Although Comte's theory has in its broad features lost nothing of its impressiveness, and although there are many valuable elements in his historical and social theories which no sociologist can afford to neglect, it cannot be said that Dr. Alengry has succeeded in that part of his task which consisted in defining Comte's exact place in the history of Sociology. 'Back to Comte' will hardly commend itself as a rallying cry for latter-day sociologists. What was fruitful in Comte—more particularly his idea of continuity—has become part of a common intellectual heritage; but there are no signs that he is in any marked way a direct or primary influence in sociological study.

The same may be said of Mr. Spencer, in spite of the handsome testimonial he gets from Prof. Giddings. The one thing that is common to the Sociology that prevails is its emphatic rejection of the biological method. To Prof. Giddings, as to Prof. Baldwin, society must be construed, not as an organism, but as a psychological organisation. In this respect American Sociologists join hands with their French, and, if we may believe M. Bouglé (*Les Sciences sociales en Allemagne*), their German *confrères.*

There is both loss and gain in this development. The crude application of biological conceptions and methods to social facts was bound to provoke a re-action; but the significance of the organic analogy, and of the whole group of ideas of which it formed a part, is not yet exhausted. As Mr. Bosanquet puts it, in his masterly survey of sociological points of view, "it has made us sensitive to the continuity of things and therefore also to their unity. . . . The 'return to nature,' and the 'noble savage,' have been invested with a significance which can never be forgotten, and which criticism can never set aside." Moreover, the ideas of selection and of the struggle for existence have been, and are capable of being still further, applied to the theory of social progress with genuine appropriateness and significance. The analogy, if properly used,[1] suggests in a very important way the general conditions upon which the maintenance of human

[1] That even those who see least in the biological analogy are liable to be unduly influenced by its associations may be seen in Prof. Baldwin's principle of 'social heredity'. It is clear that 'heredity' cannot strictly

life depends. To quote Mr. Bosanquet again, "the study of parasitism and regressive selection will continue to be a warning against the attempt to emancipate mankind from the sterner general conditions of the cosmic order". The tendency to repudiate the biological 'source' of sociological science, seems likely to end in simply replacing one abstraction by another. It is too often forgotten that an abstraction may represent a genuine side of reality, even if it is not the whole of it, and there is a real danger as well as loss incurred in any neglect of the fruitful interaction between the science of society and the general science of life. The loss is not only on the side of social science. It is natural to regard the science of life as the greatest creditor in the relation; but it is, perhaps, even more important to remember that the moral sciences, so far from being "dependent on the general laws of evolution," supply most important data for the theory of 'evolution' itself; and this consideration alone should be decisive against the claims of biological science to absorb the science of ethics. Ethics cannot be absorbed by a science of natural fact without ceasing to be ethical science: on the other hand, a science of evolution which has to include human and social life cannot stop at the formulation of phases characteristic of lower kinds of fact. It would seem as if in the immediate future the theory of evolution is likely to gain more from sciences which deal with human life and product than *vice versâ*. Any how, the relative independence of ethical science is as imperatively demanded in the interest of "the philosophy of Evolution," as in that of ethical science itself. On the other hand, it was quite time that the sufficiency of the biological method should be challenged. The biological ideas that have penetrated or permeated ethical theory have not only not revolutionised the science, but have not made any definitely original contribution to results. The effect has been, for the most part, to reinforce old truths by giving them all the significance and confirmation they can derive from being stated in terms of, and in relation to, distinctively modern experience, in the widest sense. All that is essential in the idea of 'the social organism,' had already been stated by Plato and Aristotle: the analogy goes further in modern life in proportion as our experience of both terms is wider and deeper: but the Greek thinkers had at least the advantage of not being overwhelmed

be applied to the process of individual 'acquisition' or 'personal adaptation'. Cp., the same writer's attempted classification of the various sorts of 'Selection' (App. B).

by the influence of what Mr. Bosanquet terms "the sciences of the lower life": they were under no temptation to 'explain' the higher by the lower.

The claim of Sociology to absorb not only ethics, but political economy and other branches of social investigation is even less justified by results. So far as Sociology is governed by the ideal of an exact science, it may be truly affirmed that economics is the only sphere in which the mathematical ideal has been in any degree realised: while the best sociological work has been done by investigators who have been quite unconscious of general sociological purpose or method. It is at least doubtful whether the kind of problems that seem to peculiarly belong to Sociology are likely to be advanced by sociologists "as such": much that passes for Sociology in general seems to be mainly an exercise in terminology, and it is always easier to use terminology than to be scientific.

That there is, however, a general science of social phenomena, or a science of sociology as such, is an assumption that has been revived in an emphatic manner in modern thought. Contemporary sociologists have exerted themselves to discover an organon for the science; or in other words to find the ultimate social fact to which the complexity of social phenomena can be logically or ultimately reduced. The ultimate social fact is to most of these writers some characteristic of consciousness—in a word, some fact of mind. In a passage which might have been borrowed from Plato, Prof. Baldwin observes that "the progress of society is, in its method, in its direction, and in its impelling motives, analogous to the growth of consciousness rather than to that of the biological organism". It has become, in fact, almost a settled maxim that the true method of sociological study is psychological, and its unit of measurement "some original and elementary subjective fact". Now, there are many things that may be said about the method that is thus suggested.

In the first place, we may well ask what it is precisely that psychological sociologists are trying to explain: for most of the theories in question are theories rather of association or of contact between individuals, than of society as such, or of society organised as a State. "Consciousness of kind," or like-mindedness for instance, according to Prof. Giddings, fulfils the sociological requirement: it is co-extensive with potential society and with nothing else. But it is clear that the mere recognition of another being as of 'like kind' with oneself, even if it could by itself explain associa-

tion, could not explain the difference between mere association[1] and a society or State, both of which involve a good deal more than a consciousness of kind, the consciousness, for instance, of membership in a social or political whole. In fact, it may be affirmed of Prof. Giddings' first principle, what he himself says of the principle of 'Imitation': there may be consciousness of kind, just as there may be Imitation, which has in it no germ whatever of society, still less of the forces which hold together the body politic. Consciousness of kind would not account for the existence of a State—either for the forces which bring it into being, or the forces which maintain it in being: it would not account for social variation or progress: it does not in itself contain any standard or criterion which could be applied to the valuation of different forms or degrees of 'community'.

To M. Tarde, who is in many ways the most typical representative of the psychological method, the ultimate social fact is 'Imitation'. To this theory as stated by M. Tarde Prof. Baldwin objects, that it is void of content. Imitation is the means, but what is it that is imitated?' M. Tarde would reply (*La Logique sociale*)—'beliefs and desires:' Prof. Baldwin says 'thoughts'. But, apart from the 'matter,' is it true that Imitation is the 'method' of social organisation, and if so, in what sense? The answer is a little difficult on account of the extended meaning which is given to 'Imitation,' especially by Prof. Baldwin, with whom Imitation seems to stand for any form or degree of mental appropriation or assimilation. Any how, it would seem that the process of social organisation is not one of 'imitation' (in any essential sense) at all, but of adjustment of members in and to a social whole.

Whatever may have been the shortcomings of biological sociologists, they were at least aware of the difference between a mere juxtaposition of individuals, and that kind of co-operative structure we call a society: and it is just the idea of the social organism that imitation between individuals —whatever that may exactly mean—does not so much as even suggest.

Bagehot has already called attention to the social operation of Imitation, but he did not go on to represent it as the nerve of social organisation. It is noticeable that Prof. Baldwin, in his new Preface, sums up the position common to Bagehot,

[1] It could hardly explain an association formed for any particular purpose, such an association being generated and maintained by something more than consciousness of kind. By itself, the principle could only explain gregariousness.

Tarde and himself, in the principle that imitation is the method of social 'propagation'—which is not the same thing as 'organisation'; and his criticism of M. Tarde turns upon the distinction between social 'matter' and social 'process,' *i.e.*, "between propagation and that which is propagated, between mere imitation and social progress". But this does not prevent him from describing the 'process' as essentially a process of Imitation. Prof. Baldwin's account of the 'sources' of the theory is not a little interesting. The principle that Imitation is "the fundamental *social* fact," is, we are told, an 'intuition' on the part of M. Tarde, quite independent of a like intuition on the part of Mr. Bagehot, which Prof. Baldwin in turn has established independently by genetic psychology; by the discovery, that is, that the fundamental social fact is only a development of the fundamental psychological fact. The combined result of these independent sources of the Imitation theory might seem to constitute a strong presumption in its favour: but when it appears upon closer inspection that the same word covers a considerable variety of meaning and application, our confidence is somewhat shaken: it seems to suggest that the vogue which the theory has obtained is due to the vagueness rather than the precision of the conception itself. All that the formula itself conveys is that a good deal of 'copying' goes on in social life, or that much of what goes to make society is due to the influence of mind on mind. This is such an obvious fact that it may well have escaped formulation: what is it, then, that has given to a familiar phenomenon such a range and depth of significance?

In the case of Bagehot and M. Tarde, it has really been suggested by the idea of the extension of scientific ideas and analogies to social phenomena, and so far it may be regarded as falling within the sociological tradition as transmitted by Comte and Spencer. For this reason I think that Mr. Bosanquet has perhaps made rather too much of the nemesis that has overtaken Comte's attitude towards psychology: M. Tarde's Sociology is not a psychological science in the sense in which Comte repudiated such a science. M. Tarde is a psychological sociologist in the sense that he finds the ultimate social fact in some relation between minds: but the way he gets at this conception is by finding an analogue in social life to the law of Repetition which is characteristic of all knowable phenomena. M. Tarde is completely dominated by the scientific conception of society: his criticism of the biological method, for example, is that it is not scientific enough, just because it is not appropriate to social as dis-

tinguished from biological facts. The elementary social fact is in his view 'imitation between man and man': this he conceives has only to be worked out to furnish an analytic explanation of the "collective" facts of society. Accordingly, the task of Sociology is to set forth the general laws governing imitative repetition which are to sociology what the laws of habit and heredity are to biology, the laws of gravitation to astronomy, and the laws of vibration to physics (*Social Laws*, p. 61). In other words, M. Tarde is as much under the influence of the exact and mathematical ideal of social science as Comte himself. It was only, says M. Tarde truly enough, "when the infinitesimal calculus was invented and men went back to the indecomposable mathematical element whose continuous repetition explains all, that the immense fertility of mathematics fully appeared" (p. 60), and the energy with which M. Tarde enforces the idea of Imitation is motived by the belief, that it has only to be understood and applied to be destined to work a transformation in Sociology similar to that brought about in mathematics by the introduction of the infinitesimal calculus. Nothing is more characteristic of M. Tarde than his protest against the identification of Sociology with the philosophy of history, or against the vague generalities that do duty for social science: it leads him to declare that it "is not Sociology that Comte founded". In this connexion, again, his plea for detail-work in social investigation is particularly characteristic and instructive. That such an ideal, however, is very far from accomplishment is illustrated by M. Tarde's application of his theory to the *Transformations du Pouvoir*. Like all M. Tarde's work, it is suggestive—suggestive not so much of points of view (which seem rather like old friends in a new garb) as of lines of research—but also greatly 'in the air'.

Prof. Baldwin reaches the social principle of Imitation by a psychological route: what is M. Tarde's point of departure is Prof. Baldwin's point of arrival. The method he employs is psychogenetic: it is described as a method which "inquires into the psychological development of the human individual in the earlier stages of growth for light upon his social nature, and also upon the social organisation in which he bears a part". It is clear that 'imitation' is a factor in the mental development of the individual, but (as already intimated) what Prof. Baldwin describes as Imitation goes a good deal beyond the proper or primary import of imitation. Much that he calls imitation would be more appropriately described as 'assimilation,' and he sometimes uses it in a

sense in which it approaches to the meaning of 'realisation'. The only reason why Prof. Baldwin makes imitation the essence of the matter appears to lie in the idea that personal growth is effected through the play of give-and-take between individuals. But, according to Prof. Baldwin's own account, the process is one of individual appropriation rather than of simple or direct imitation. Certainly, imitation in the strict sense does not seem to play an important part in the higher stages of mental development, and as applied to social life it seems even less significant, for it does not explain that unity of differences which Plato and Aristotle regarded as the essence of society. Moreover, the stress laid on the imitative aspect of the process tends to suggest that the individual is not born but made social, that his social character is something superadded through contact with others. Prof. Baldwin seems in fact embarrassed with his own method which appears to me to be misleading from the outset. Instead of starting with an analysis of the idea of social solidarity and all it involves, he endeavours to get it out of the play of imitation between individuals: he tries to find help for Sociology in psychology rather than *vice versâ*. Here, again, a valuable hint is given by Plato. Plato also proceeds on the assumption that the ultimate source of social unity and organisation lies in the individual soul. Justice is an excellence of the soul: but what is the soul? Plato answers in effect that we can only find what the human soul is by seeing it at work in society. No examination of the individual soul will give us any definite idea of the characteristic forces of human nature. We can only discover what human nature is by following its realisation in action, by deciphering its objective expression in all the visible and actual institutions of social life: for it is only in its outward expression that the invisible is made manifest. Following this method, Plato also reaches an ultimate and fundamental psychological fact; the fact, namely, that the soul has the capacity and is under the necessity of living a common or co-operative life. That the State is made up not out of similar, but out of different individuals, is as axiomatic with Plato as with Aristotle. We are not surprised, therefore, to find Plato emphasising the double principle of the unity of the whole and the difference of the parts, while modern sociologists deprive both the similarities and the differences between individuals of any social import.

It is this initial fallacy of method that Mr. Bosanquet drives home in his characteristically incisive way: the error comes, as he puts it, from working with similarity instead of

identity, or, again, from working with the notion of society as simply "self" and "others". In more than one reference he points to the difficulties that can be traced to this imperfect logic: it underlies the successive failure of Bentham, Mill, and Spencer to explain the rationale of political self-government; law and government being assumed to be essentially antagonistic to the 'self' of man, as alien, or at least standing in no positive or vital relation, to human nature: what social restriction such a theory is forced to admit is always conceived as essentially a coercion of 'one' by 'others'. The error is found also to infect current conceptions of psychological Sociology. The mind of a crowd (rather than that of an army) is taken as the type of a 'true social mind' (Le Bon): the form of the social process is analysed into unreal distinctions between 'imitation' and 'invention' (Tarde and Baldwin): we have two types of law marked off, one of which corresponds to social similitude, the other to the social division of labour (Durkheim).

Mr. Bosanquet himself, as the title of his book suggests, approaches the subject from the philosophical point of view. The manner in which Mr. Bosanquet corrects the imperfection attaching to the working conceptions of English political philosophy, and by the help of the higher elements in Rousseau's theory of the general will establishes the true ground and nature of political obligation in the idea of 'self-government,' is sufficient by itself to make *The Philosophical Theory of the State* a philosophical classic. The way in which Mr. Bosanquet applies his central idea—the conception of law and government as representing the higher self—to the problems of liberty and rights, of State action and punishment, is equally admirable, even if it does not add anything essential to Green's *Lectures on Political Obligation*.

There is one remark, however, that one is tempted to make in mitigation of the sentence passed upon English political philosophers, and it will serve to lead up to a more general observation upon a certain limitation which Mr. Bosanquet's method imposes upon his treatment of the relation between the individual and society. Mr. Bosanquet is, of course, perfectly within his rights as a philosopher in criticising partial or inadequate points of view, for philosophy demands wholeness and completeness of view: but then the point of view of the writers he criticises was not, at any rate explicitly, philosophical. The real defect of the English publicists is the defect that attaches to all uncritical treatment of moral or political questions: they used conceptions which they

did not further examine or analyse. It was not so much that they were bad philosophers as that they were not philosophers in the strict sense at all: they did not have before them the philosophical problem as such, and the only instrument they use is 'common sense' stimulated by immediate practical interests. What they missed in the philosophical, they made up in the political instinct. After all, 'liberty' (in a partial and unphilosophical sense, if you like) was to all these writers a problem of practical politics, and the 'State' loomed before them in the very palpable form of a suspect and fallible 'Government'. They move in the region of *media axiomata*, though they cannot at the same time avoid raising principles or employing conceptions which are not able to bear the test of complete theory and, therefore, of complete practice. Thus, Mr. Spencer's polemic against State-action really starts from a vivid and abundantly justified sense of the unwisdom of governmental action: it no doubt leads him on to principles which cannot survive the scrutiny of theory: but neither he nor Mill show any signs of being interested in the theory of the State as such. You have only to scratch the political philosopher in either to find the political radical. The point, for instance, that would strike them about Hegel's theory of the State is its suggestion of political fetichism. The negations of Bentham, Mill, and Spencer, were the negations that were wanted: that they do not constitute a true 'theory' of the matter is shown by their failure to cover the practice of the modern State: but as Mr. Bosanquet admits, their theories (however imperfect as whole or ultimate statements) when confined to particular problems often led to sound conclusions—conclusions it may be added which might not have been so readily derived from a more ultimate theory. It was not altogether a misfortune that Bentham was a reformer rather than a philosopher of law. The English thinkers were not philosophical enough, it may be freely admitted: they were too much dominated by the sense of actual evils, and they approached the problems of law and government from a side which gave them a bias towards the negative conceptions which Mr. Bosanquet weighs in the balance of a purely theoretic treatment. Generally it may be said that the tradition in English political thought is against the detachment of view demanded by philosophy: it is too deeply rooted in native political instincts to think abstractly or to study "something as a whole and for its own sake". It is perhaps significant that Mr. Bosanquet should operate throughout with language and conceptions that have such a foreign and 'un-English' look, and at the point where

we expect him to work out Rousseau's theory in terms of our own political and social experience Mr. Bosanquet passes on to trace its development in the political conceptions of Kant, Fichte and Hegel; so that it would seem as if it was Hegel's analysis of the State that Mr. Bosanquet was chiefly interested in bringing into relation with "the actual facts of life". It is a pity, perhaps, that Mr. Bosanquet gives so little relief to the abstract character of the argument, and that he could not have presented it in a more concrete, or less academic form. The principles which Mr. Bosanquet advocates are of such profound value and importance that one cannot help wishing they could have been translated a little more freely into the vernacular—into something nearer to the experience of an English citizen. We feel that the view which Mr. Bosanquet presents is the only adequate or ultimate view, and we must also acknowledge the luminousness as well as the power of statement with which it is presented. The whole significance, indeed, of the State for human life can only be mastered by a resolute examination of ideas; but Mr. Bosanquet has already shown us in *Aspects of the Social Problem* that he has not only the power of statement that satisfies a philosopher, but also the power of realising abstractions, of bringing ultimate principles into living touch with common experience and the actual facts of life. It is true that part of Mr. Bosanquet's object in *The Philosophical Theory of the State* is to emphasise the significance of its subject-matter to "the general life of peoples," and to bring out "the greatness and ideality of life in its commonest actual phases"; but whether it will seem to 'palpitate with actuality' to any one not accustomed to "thinking obstinately" is, I fear, very doubtful. And here it must be confessed that Mr. Bosanquet's attempt to find confirmation for Hegel's analysis of the modern State in the sentiments that operate in the everyday life of an average citizen or an English labourer does not altogether meet the difficulty. No doubt, the "feeling or insight which constitutes a consciousness of a common good" are implicit in the lives of many persons who do not concern themselves with any such abstract ideas as are expressed by "the State" or "the general will". In his anxiety, however, to justify the worth of the State, as such, for the life of man, Mr. Bosanquet is disposed to lay little stress on the assistance that may be given to the imagination of the labourer by efforts of reformers directed towards making the idea of a State, which exists for the attainment of a common good, more visible and more palpable than it actually is; and yet this consideration seems really as much a part of the argument as the other. One

misses in Mr. Bosanquet's theory of the State such a note as is struck by a not less distinguished idealist in a passage like the following:—

"And material civilisation must become the visibility of the spirit. Instead then of the verbal admission of civility, that we are all in a way fellow-workers and have in some sort a common right, what is wanted is the practical carrying out of that idea in every detail of reality. A community is civilised in which the solidarity of human effort is the first and foremost principle, in which citizenship is realised as the governing idea of all life. But realised and real it must be, and not merely acknowledged as a mental principle or in words and forms. A community is not civilised in which the subordination of all the materials of civilisation to the common weal does not receive palpable expression. That is the point for which the Socialists fight, however much they may sometimes lose sight of it in side issues."[1]

The prevailing note of optimism in Mr. Bosanquet's book is, of course, natural and even necessary; a purely philosophical method must from the nature of the case make the most of its object. It is really a question of emphasis rather than of principle: but the general effect of Mr. Bosanquet's treatment is to suggest that, inasmuch as the idea of a State is realised wherever there is a State, any particular State is entitled to rather more than the credit it gets from answering to the idea of a State at all: which is, indeed, true and important. But, after all, the State exists for man, and, as Mr. Bosanquet's theory fully admits, the State is not ultimate nor above criticism: but the position occupied in political philosophy by "the analysis of a modern State," inevitably tends to suggest finality as to the general form of social organisation. The Hegelian theory was found, of course, to admit of an extreme Left as well as an extreme Right application: for if the State has its value in the human capacities which it is the means of realising; if, as compared with the idea of humanity, the State or nation is the only effective medium for the purposes and possibilities of human life; then the argument cannot stop short at "reverence for the State"; and the good man is not simply the good citizen, unless good citizenship is taken to include an active sense of what ought to be, but is not. With Socialism as thus understood Mr. Bosanquet would have no quarrel: the weight of his argu-

[1] Wallace's *Lectures and Essays on Natural Theology and Ethics*, p. 159. Prof. Wallace adds that "it is an aim not, indeed, probably to be reached by what in their sense is called the 'socialisation' of the means of production".

ment falls only upon ordinary Socialism which seeks to achieve an unspiritual end by unspiritual means: and, moreover, Mr. Bosanquet might say that he is only dealing with preliminaries and principles, and that the defectiveness of any particular State is not part of the question. Still, a philosopher who approaches his subject from the point of view of pure theory, is as much liable to a bias as those who approach it with a more practical aim, and the theoretical bias can hardly fail to give a certain twist to the argument. A philosopher certainly does valuable service if he can bring home to his fellow-citizens all that the State, the highest human achievement, really is; for to ordinary consciousness the State is a mere matter of course, if nothing worse. To Mr. Bosanquet, as to Hobbes, 'an actual living society is an infinitely higher creature than a steam-engine, plant or animal': but the enthusiasm of the philosophical analyst for his object may tend to idealise the actual in the wrong way or in a way not intended. The object of political philosophy, says Mr. Bosanquet (after Hegel), is merely to understand what a State 'is'; and for this purpose it is not necessary that the State which is analysed should be "ideal," it is sufficient that it should be a State at all; just as the nature of life is represented pretty nearly as well by one living man as by another. Is this quite a real or proper analogy? Is the State a merely natural fact of which it is sufficient to know that it answers to its idea? Is not Mr. Bosanquet's analysis of the State really governed by an ideal conception, suggested but not fully given by the actual—by a conception of the complete possibilities and purposes of distinctively human life: and, if that is so, does not the argument itself demand that more stress should be laid on the partial character of the realisation of the ideal attained by any actual community? It seems, in other words, to be as much a part of the idealist argument to insist that the actual is not the ideal, as it is to insist that the ideal is not reached by abstraction from the actual.[1] A modern State may be as 'perfect' a State as any other for purposes of analysis, but if, as Mr. Bosanquet finely puts it, the State is 'a working conception of life'—if so far any State is better than no State, since it is the State alone that can secure the possibilities of good life—then the argument admits of the turn which Plato and Rousseau gave to it; for it was just this idea that constituted the element of revolt in both. It is, no doubt, true

[1] This seems to be the point of the difficult passage in Plato's *Republic*, p. 501, *a*, *b*.

that their sense of the discord between the actual and ideal ended in making them 'not ideal enough': both seem at times to lose their faith in human nature, and to sink to a lower level, so that we feel we have to turn to Aristotle, for instance, for the more purely ideal, because the more purely 'theoretic,' treatment of the State and its institutions. But for all that I am not sure that the understanding of the relation of 'politics' to human nature does not go deeper in Plato and Rousseau than in Aristotle and Hegel, and that the note of "cynicism" and of revolt was not more truly philosophical than the note of ideal acceptance. It is at any rate significant that Aristotle was idealising the Greek State at the moment when it had ceased to be a working conception of life. It may be ultimately a matter of temperament: still, with all his wonderful understanding of 'what is,' there is after all a certain pedantry about Hegel's theory of the State; its 'logic' is undeniable, but there is perhaps a deeper logic than the logic of the philosophical "looker-on". I would even hazard an opinion that, with all their imperfect logic, Bentham and Mill have done more to humanise politics than Hegel's philosophy of the State, profound and in a sense ultimate as it is. The question, of course, arises in other forms; but the general tendency of the Hegelian method is to bid people seek the ideal in the actual (cp. for instance Bradley's essay on "My Station and Duties")—a wholesome but not a whole truth. This was not after all the method of the Greek thinkers to whom Mr. Bosanquet refers us: to Plato and to Aristotle the science of human life was not merely theoretical but practical: and however philosophically precarious it may be to approach the problem of the State from the side of practical or semi-practical aims, I am inclined to think that this may be the reason why Green's *Lectures on Political Obligation* produce on the reader a greater impression of actuality than Mr. Bosanquet's *Philosophical Theory of the State*, though as a purely philosophical and intellectual effort Mr. Bosanquet's book might almost be considered a *tour de force*.

On this account I am disposed to think that if Green's 'pessimism' is a half-truth, Mr. Bosanquet's optimism is a half-truth also, and on the whole the more deceptive. There is almost too much method in Mr. Bosanquet's wisdom, or perhaps too much sheer intellectuality of view: it is well to see life as a whole, and to find the ideal everywhere, but is it not also just a little academic? I do not know that any social reformer who believes in the reality and possibilities of character would deny the facts which, as

Mr. Bosanquet says, "seem to show the essentials of life to be far more identical throughout the so-called classes of society" than is admitted by the passage which he cites from Green about "the untaught and underfed denizen of a London yard with gin shops on the right hand and on the left". Mr. Bosanquet speaks here with more than theoretic authority; but I am not sure that the facts on which he relies quite bear out "the conviction that the time has gone by for the scrupulous caution which Green displayed in estimating the value of the State to its members," though they certainly draw attention to the side of the truth which is most liable to be neglected or forgotten by social and political reformers.

But it is, as I have said, mainly a matter of emphasis: I freely admit that Mr. Bosanquet's theory is broad and deep enough to include all that is valuable in the English thinkers whom he criticises.

The other reason Mr. Bosanquet gives for a new work on the same lines as Green lies in the "attempt to apply the conceptions of recent psychology to the theory of State coercion and of the Real or General Will, and to explain the relation of Social Philosophy to Sociological Psychology". It is this motive which constitutes the special novelty and originality of Mr. Bosanquet's *Philosophical Theory of the State*, and brings it into touch with the current movement in Sociology.

I have already indicated the point of the criticism which Mr. Bosanquet passes upon Sociological psychology. Mr. Bosanquet says of psychological sociologists pretty much what Plato and Aristotle say of the ancient physicist's discovery of 'mind' in nature: Anaxagoras, they complained in effect, had spoken a great word, but failed to realise it. The psychological sociologists in the same way have not made the most of their clue: they have found the key, but put it in the wrong side uppermost: they work with "association" when they might work with "apperception". Society, no more than the individual mind, can be understood apart from the idea of system; it does not, therefore, depend upon the imitation of one mind by another, but upon the action of adapted differences within a social whole. The working ideas of Sociology should be those of function, structure and organisation—of a true identity in difference, not a mere contagion of similars. If you are going to explain society in terms of mind, you must at any rate take mind where it is most, not where it is least, mind: any casual association of psychical units no more explains the structure

and working of a mind than any mere association of human units explains the structure and working of a State. All current theories, however, of the relation between the individual and society treat it as a relation between individuals and others rather than a relation of individuals to individuals within a whole. It is just the organisation of purposes which the State embodies that these theories fail to explain: the mere individual points beyond himself in order to become a true individual: he 'finds' himself in that form of co-operative life we call the State.

The way in which Mr. Bosanquet (and I may add Mrs. Bosanquet, cp. *The Standard of Life*) brings the doctrine of apperception to bear upon the problem of society and social progress is certainly very interesting and suggestive: and I am bound to say that his criticism of the inadequacy of the categories which psychological sociologists have employed seems to be decisive, so long as we reduce the idea of Imitation and the like to their lowest terms. But as a matter of fact many of these theorists, as already suggested, would deny that they mean by Imitation [1] precisely what they ought to mean, or give it quite the range of explanation assumed in the criticism. That ideas and practices are propagated in human society by means of 'imitation' is not less true because it is not the way in which, say, a committee adjusts its ideas: it is not even a truism, but a truth, the importance of which is worth consideration: it is *a*, if it is not *the*, social phenomenon. It is conceivable that an investigation of the conditions of 'imitativeness,' on the one hand, and 'imitability' on the other, might yield results of importance to the legislator and to the reformer quite apart from the light that it might throw upon social events and processes. If the working of 'Imitation' and 'Invention' are not sufficient explanations of social progress, a good many theories of social development have gone astray through neglect of some of the facts which they cover, as M. Tarde, for instance, shows in his pertinent criticisms of Coulange's *La Cité antique* and Loria's *Les Bases economiques de la Constitution sociale* (*Transformation du Pouvoir*). On the other hand, M. Tarde explicitly maintains that the relation between two

[1] I suspect that Imitation is part of a wider psychological fact—the tendency in human nature to pursue the least line of resistance or to reach things by the shortest route. Such a tendency is of immense significance in intellectual matters: *e.g.* the treatment of industrial co-operation is simply passed on from text-book to text-book till you reach a non-imitative treatment in Mrs. Webb's study of the co-operative movement.

persons, one of whom exercises a mental influence upon the other, is the one essential element in the social life, and that "it always consists, at bottom, in an imitation of one by the other".[1] It is certainly difficult, as already observed, to see how this explains the kind of co-operation, based upon reciprocal differences, which social life implies, and it by no means follows that the relation of the child to the adult—which is, by the way, not wholly imitative—is typical of the social relation as such: which suggests that the genetic method adopted by Prof. Baldwin is of doubtful validity. It is at any rate doubtful whether the kind of consciousness on which society depends is simply an extension of the process by which the child arrives at the consciousness of 'self' and 'others'.

Mr. Bosanquet extends his criticism in a way which suggests doubts as to any 'explanation' of society or the State being within the reach of psychology as such. He compares the relation between psychology and logic: psychology investigates mental events simply as events without any reference to their meaning or value, or their relation to reality: logic studies mental events only so far as they enter into or become knowledge. In the same way, psychological sociology and social philosophy approach their subject-matter from different points of view: the one treats it as an object of empirical or natural science, the other as exhibiting different degrees of value or reality. In other words, the point of view of Social Philosophy is teleological: what creates a State (from this point of view) is the idea or purpose which makes it what it is: and this idea or purpose is to be found in its relation to the development of human nature. The essence of the State, therefore, as Plato and Aristotle put it, lies in the way it serves and expresses 'the soul' of man, and enables it to live at its best. Mr. Bosanquet, however, seems to suggest that the better the psychology—or rather the higher the mind that it attends to—the narrower is the gulf between psychological Sociology and social philosophy. In other words, he seems to imply that the preliminary abstraction from reality which constitutes psychology as a positive and impartial science shows itself to be too narrow for a science of mind as such. The distinction between the two points of view may, however, be maintained with advantage to both. "Philosophy gives a significance to sociology; sociology vitalises philosophy" (p. 51). In this way, Mr. Bosanquet would adjust the 'science' and the 'philosophy' of society: the method of Comte and the method of Hegel.

[1] *Social Laws*, p. 89.

I confess I am somewhat sceptical as to the precise value of the psychological Sociology in vogue. No one can deny that the philosophical method (of which Mr. Bosanquet's book is such a fine example) has produced results of permanent value: it really fulfils its object of understanding what a State is, and it is able to suggest principles of guidance as well as standards of value. But the attempt to resolve the phenomena of society into some such mental process as 'Imitation,' or into some such original and elementary subjective fact as 'consciousness of kind' seems to be neither science nor philosophy. If we are going to interpret society in terms of mind, then we must be able to exhibit, as Hegel does, stages of mind: we must be able to show the place of social relations in the growth of mind. Hegel's conception of history as the gradual realisation of Freedom is one thing, but the representation of social evolution as determined by a consciousness of kind is another. So long as sociological method simply stands for wholeness of view —as against the abstractions of this or that branch of social science—or so long as it stands for the introduction of a scientific method into the consideration of human affairs, it supplies a regulative idea of no little value. The position of Sociology as thus conceived might perhaps be compared to the position of philosophy in relation to the special sciences. It is important to vindicate a sphere for philosophy as apart from the sciences; but as soon as this is done, the temptation arises to treat philosophy itself as a definite science. We must then ask what is its subject-matter, and must suppose this subject-matter to have as fixed and definite a character as, say, the subject-matter of chemistry; whereas this is just what is not true of the subject-matter of philosophy. There is no subject-matter of philosophy in the same fixed and definite sense as oxygen is of chemistry. Rather, philosophy is a spirit which should animate all special sciences and hold up an ideal of science never realised, because always progressive. We may say much the same about the position of Sociology: Sociology is regulative rather than constitutive of social science: directly we treat it as a special science, we try to find for it a subject-matter of its own which is either no subject-matter, or is simply the minimum of form required to constitute a social fact. It is pretty much in the same way that a science has been made of 'Formal Logic'. Sociology, as, for instance, it is represented by Prof Giddings, seems to me dangerously akin to a pseudo-science—neither light-giving nor fruit-bearing. To my mind Sociology represents an ideal, and an ideal which stultifies

itself when it is metamorphosed into a science with a province and a subject-matter "as definite as that of any other science". It must, moreover, be regarded as dealing ultimately with 'norms'—as a normative science. As Mr. Bosanquet observes, Sociology in becoming psychological has not given up its positive standpoint: it has no means, therefore, of applying standards of value to this or that form of social organisation: its interest seems to chiefly lie in finding the minimum which goes to make a society. But the difficulty of maintaining an indifferent or positive attitude towards social phenomena is seen in the actual teleological tendency of sociology itself. Prof. Giddings no more than Comte can help introducing elements of valuation into his interpretation of society: both really value the process of social evolution for what it brings out, that is, for the quality of human life it produces. If society is "an organisation for the development of humanity" (and not merely consciousness of kind), what becomes of "the definition of sociology as an explanation of social phenomena in terms of natural causation," or indeed of its claim to be an 'explanatory' science at all? The conception of "a science that tries to conceive of society as a unity, and attempts to explain it in terms of cosmic cause and law" is certainly grand enough, but is it not also a little crude? And is it not getting the 'scientific' treatment of society on rather cheap and easy terms? Any how, a careful study of professedly sociological literature, interesting and suggestive as it often is, has only confirmed my conviction that Sociology has still got to make good its scientific pretensions, and more especially its claim to absorb ethics and economics—to say nothing of other studies.

At the same time I do not wish to deny that the psychology of what may be called the social mind does not open up a fruitful field of inquiry. The literature of 'suggestion' and the social value of suggestion has, as Prof. Baldwin observes, given to social psychology "its most respectable showing": but it has also been responsible for "very crude and unphilosophical" theories of social association, as the same writer shows in his criticism of the theory of 'Mob-Action'.

Prof. Baldwin's own contribution to the study of social psychology is certainly not wanting in an appreciation of the fact to be explained (cp., *e.g.*, the criticism just referred to, and the distinction drawn between 'companies' and 'societies'); but owing partly to his terminology and partly to his method, I find it difficult to get a distinct or consistent view of his position. It is clear that the mental development of a child is from the nature of the case hypothetical at the best, and

any interpretation we may give of it must partake of conjecture. Moreover, the starting-point of individualistic psychology is itself an abstraction; which is liable to pass into the assumption that the individual mind is there to begin with. The result is that a bridge has to be constructed from the individual to the social unit. This bridge is the imitative process, and thus we get an exaggerated stress laid upon the phenomenon of social sensitiveness and suggestibility in the development of the moral and social individual. But the mind is after all what it experiences, and none of its experience can be treated as foreign to any nature it has of its own. Prof. Baldwin's account of the genesis of the social consciousness invites comparison with Hegel. Prof. Baldwin indeed criticises Hegel for neglecting psychological explanation, but, as Prof. Royce rather quaintly remarks, Hegel was "not interested in individual psychology". He would, indeed, have regarded it as an impossible abstraction: like Plato, he held that the soul must be studied in the larger letters, that is, in the institutions in which the characteristic forces of the soul are embodied. Apart from society the human individual could not develop the germ of conscience or intelligence that he has in him as a self-conscious being: he could not even arrive at the consciousness of 'self,' (except in the sense in which self-consciousness might be produced through any experience of a not-self). So far I presume Prof. Baldwin and Hegel would be agreed: but in his anxiety to describe the psychological process by which the individual becomes a social and a moral being, Prof. Baldwin is led to seek its whole origin in "a give-and-take between the individual and his fellows". But is this really the essence of the process by which the individual reaches the recognition of a moral order of life, as revealed not only in the behaviour of persons but in social custom and institution? The moral and social intelligence as such is not a development of "the function of imitation"; unless imitation is to be used in the sense in which Plato describes moral education as a process of training the power of the soul to 'imitate' or 'assimilate,' through the various influences of personal example, of art, and of noble surroundings, a plan and order of life. The process of moral habituation involves a good deal more than a process of imitation.

But, apart from any reference to Hegel, does Prof. Baldwin's method explain the genesis of the distinctively moral consciousness? He seems to regard the moral sense as a function of the thought of 'self' as compared with 'others'. But it is difficult to see how the mere consciousness of 'self'

and 'others' contains the germ of a moral relation. The relation between 'self' and 'others' can only become moral through a third idea—and that is the idea of morality itself. Granted that the ethical sentiment is occasioned or made active through the relation of self to others, there is nothing in that relation which contains the idea, still less the ground of a right relation. The individual, again, "learns his ethical lessons from society": but all the lessons of society are not equally good 'copy'. What is to direct the choice or discrimination of the child? It is, we are told, "the child's imitative growth into a sense of ideal personality" which provides him with a standard of social values; and Prof. Baldwin endeavours to show that not only the sense of self, but the sense of a moral and ideal self, is developed in the individual by 'imitation' and 'imitative obedience'. There is the self of 'habit' and there is the self of 'accommodation,' upon which supervenes the "self that fulfils law": "we do right by habitually imitating (note the sense of imitation) a larger self whose injunctions run counter to the tendencies of our partial selves". The psychogenesis of the ethical sentiment as described by Prof. Baldwin is interesting enough; but just so far as he seeks the origin of morality in the play of imitation between individuals, he seems to make the idea of obligation in the end something merely subjective—an impression which is confirmed by a reference to the affinity of his view with that of Guyau. The 'sense' of obligation may be "the sense of the lack of unity in the highest region of moter-function": but is there no difference between the feeling and the fact of obligation? Both the nature and the growth of the moral sense seem to be much more complex than Prof. Baldwin's account suggests: he has shown that 'we begin our public affections in our families,' but his account of what is involved in moral understanding, or in its development, seems hardly adequate. Morality is after all not a mere psychological process: it depends upon a capacity for moral ideas, a capacity which makes demand upon every 'psychological' instinct—not merely the instinct of 'imitation'—and, if it is developed largely through the play of imitation between individuals, it rests in the last resort on the growing recognition of an order or system of life which we do not make, which is greater than ourselves, and yet is what we ourselves most desire. The formation of such a point of view involves other agencies than imitation, as Plato showed in his account of moral habituation; moreover, it is the actualisation of some deeper potentiality than the tendency to 'assimilate copy'. Such a potentiality can only be described as what Plato and

Aristotle called 'Reason,' Hegel called 'Mind' or 'Spirit': but for the 'prior' nature of Reason or Mind, no such psychological experience as Prof. Baldwin describes could possibly give rise to moral ideas: there must be working through it all a principle, which we may not call a distinctively moral principle, but a principle which makes morality possible, and which when developed takes the shape of explicit moral ideas: and the experience itself is not simply the experience that arises out of the relation between individual persons.

The question which Prof. Baldwin really raises is whether the 'whole origin' not only of the thought of 'self,' but of the thought of an 'ideal self' is 'from persons'. Is it true to say—apart from society, no conscience? Apart from society and social experience there would be little or no content for conscience, but the condition of the possibility of conscience can only be found in an inner feeling of self-affirmation which is at once the root of morality and the source of self-judgment. The feeling that you have failed to affirm or assert yourself, which as far as one can see any kind of failure in action might produce, lies at the basis of self-approval and the reverse; it is not created by, though it is made active by, the lines of action 'suggested' to the social self. Does imitation, again, give a sufficient account of the genesis of an ideal self? It is true that we first seem to see types of excellence or perfection in some person or persons, but this does not warrant the conclusion that imitation of one person by another is the process by which the individual comes to identify himself with an ideal type of human perfection. Prof. Baldwin, in fact, seems to treat the occasion of moral development as if it were the ground, or the 'origin'. Moreover, even if the method could account for moral beliefs or predilections, it does not suggest any guarantee for their truth, or their relation to reality. Morality seems to involve not only the sense of a general will, but of its reality.

In spite, therefore, of the very interesting and suggestive treatment of moral psychology by Prof. Baldwin, I venture to think that no merely psychological account of morality can satisfy the requirements of theory. I also venture to doubt whether the points of view of psychology and philosophy can be fused without being confused. Mr. Bosanquet seems to suggest that in its highest range of explanation—in its explanation of the logical mind or of 'the mind where it is most mind'—psychology and philosophy tend to meet. I am inclined to think that it is more important to emphasise the division of labour. The more empirical psychology

remains—the more it tries to reduce conceptions to the definite psychological facts to which they correspond—the better for philosophy. Take, for instance, Mr. Bosanquet's own account of mental organisation: regarded as a psychological account it seems to suffer from the converse defect to the 'association' theory with which it is contrasted: it is really too philosophical to be strictly psychological: as a regulative idea or point of view it is no doubt valuable, but, if it is to be taken as a description of definite psychical facts or of what strictly 'happens,' it must be described as obscure. It would, however, take me beyond my immediate subject to raise the questions involved in the relation of empirical to speculative psychology, or of psychology generally to fundamental philosophy. Whether psychology should absorb philosophy or *vice versâ*, or whether they are only working from different ends of the tunnel, does not seem to be a matter of great importance: for in any case the distinction between the points of view remains, and, however much they may run into one another, their centres of interest are different. There will always remain a field (however indeterminate) for psychology as a positive and empirical study, and there will always be a demand for the criticism of philosophy. The present situation in sociology is, *mutatis mutandis*, an illustration of both propositions, but of the latter perhaps more than the former; and it is not the least distinction of Mr. Bosanquet's book that he has brought within our view two apparently independent traditions of social science—that of psychological sociology, as the last result of the positive method, on the one hand, and that of social philosophy as represented by Plato and Aristotle and their idealist successors, such as Rousseau and Hegel, on the other.

There is one point, however, on which modern sociologists and social philosophers seem to join hands, and that is the rejection of "economic sociology"—a type of which Marx and Loria are the dominant representatives. Here, again, the philosophical as also the psychological criticism of an abstraction is logically justified: but, as in the case of the reaction against the biological method, the critics tend to fall into an opposite abstraction (and to forget that an abstraction, if not the whole, may be none the less a genuine side of reality). The action of economic interests and motives is almost a neglected element in a good deal of current Sociology. Prof. Giddings, for instance, seems content to observe that economic activity is a form of human desire, and economics is therefore dependent on Sociology in the

sense that the desires which the economist "takes as he finds them" can only be explained in the light of "the evolution and ultimate causation of desire in general". But it is hard to find any such explanation or derivation of the economic activities, and of the social relations to which they give rise, in Prof. Gidding's theory of social forces: certainly "consciousness of kind" and of "similarity" is not specially helpful to a student of economic forces. Sociology, we are told in a recent work by the same author, "can render no greater political service than to show that like-mindedness is the absolutely essential condition of social cohesion and of the efficiency of any social organisation". But "like-mindedness" by itself certainly does not contain the essence either of specifically political (as distinguished from merely social) or of specifically economic forces. The purely abstract and formal character of sociological reasoning as such could hardly be better illustrated than by the incapacity of its "first principle" to account for the subject matter of either politics or economics. It may be said generally of any 'Sociology' that thrusts economic forces into the background, that it is neglecting the field in which the 'positive' science of society has really made any assured ground at all. The criticisms passed on the one-sidedness of the economic interpretation of history by Mr. Bosanquet and Prof. Barth are exceedingly pertinent: but they are really directed against the tendency of the economic school of sociologists to explain social causation in material rather than ideal terms. Still, the economic 'abstraction' is, in its turn, a wholesome corrective of the 'ideological' abstraction: and it so happens that both points of view were recognised by Saint Simon, the pioneer at once of Sociology and Socialism. As Prof. Wallace says of Socialism generally, Economic Sociology had its origin as a part of the general protest that has been raised in the realistic interest against a fantastic and unsubstantial idealism or spiritualism or intellectualism. But Economic Sociology as such (like all Sociology as such) aims at a unity of view which it can only attain by what looks like unity, but what is really mere simplicity of view; and Economic Sociology can only exalt itself by humbling itself, that is by being content to be scientific: and it can only be scientific by the method of special and definite investigation. The analysis and history of a national industrial system, conducted with due reference to the social and intellectual evolution of which it forms a part, opens up one among many fruitful fields of sociological study. Mr. and Mrs. Sidney Webb's studies in Trade Unionism, and Mr. Charles Booth's in-

vestigations into life and labour in London, are suggestive types and examples of a positive and a realistic study of social structure. The work to be done is so vast in extent that it requires organisation and division of labour: it also requires the control of philosophy, or of "thinking things together". It seems a matter of indifference whether you give the title of 'Sociology' or of 'Social Philosophy' to the general plan of such studies: the one suggests the more positive, the other the more teleological aspect of social science.[1] The main thing is that Sociology, so far as it claims to be an application of the scientific spirit to social and political problems, must be prepared to 'imitate' the 'infinite patience' of science. It is only in this way that we can build up from below the foundations of that Sovereignty of Knowledge to which Comte, like Plato, looked for the reorganisation of social and individual life. It is only to this kind of sociological study, undertaken in a serious and scientific spirit, and controlled by "the idea of the good," that we must look for the progressive realisation of "the sociological idea".

[1] The sort of schism that prevails in the points of view is symbolised by the institution of the two separate "schools" of "Political and Economic Science," and of "Ethical and Social Philosophy," recently established in London. In either school the 'other' point of view is likely to fall short.

II.—THE ETHICAL SYSTEM OF HENRY SIDGWICK.

By James Seth.

Within the past year we have lost the two most distinguished moralists of our time—James Martineau and Henry Sidgwick. The former belonged to an older generation, and represented an older type of ethical theory. He represented the Scottish Philosophy of Common Sense, and was the author of an original and interesting version of Intuitional Ethics. A great preacher as well as a great teacher, a rhetorician as well as a thinker, Martineau brought to the discussion of ethical questions a moral enthusiasm, a spiritual fervour, and a rich eloquence which gave his books an irresistible charm and made them a real influence on character. Sidgwick was the adherent of no historical school; he represents the contemporary tendency, in ethics as in other fields of thought, to reconcile the various and hitherto conflicting views in a larger and more inclusive truth. He is neither Intuitionist nor Utilitarian, neither Rationalist nor Hedonist, but an Intuitional Utilitarian, a Rational Hedonist. His temper, too, is the scientific temper of our age. Like Mr. Spencer and Mr. Leslie Stephen, he endeavours to make ethics, in the strictest sense, a science; more consistently than either, he resists any appeal to the feelings of the reader, and forbears to preach. Holding that the discussion of such questions had been too often vitiated by the desire to edify, he strove to maintain in ethical discussion the atmosphere of a physical or mathematical investigation, and no reader of his great work will dispute his success in the attainment of this ideal.

In this latter respect Sidgwick's *Methods of Ethics* stands out in sharp contrast with another notable ethical treatise of our time—the *Prolegomena* of the late T. H. Green. We rise from the study of Green, as from that of Martineau, with a quickened sense of the importance of conduct, with a new realisation of the dignity of life; and we feel that the author has deliberately allowed his own moral enthusiasm to infect

his book. It has been said that "if one had been asked to name a man from Oxford and a man from Cambridge who, during the last thirty years of the century, would serve as examples of the intellectual spirit of our Universities at their best, one must have named Green for Oxford and Sidgwick for Cambridge". However that may be, I think we must recognise in the intellectual calm and moral self-repression of Sidgwick the qualities that make him the more distinctively and characteristically *English* of the two moralists. As a matter of fact, the influences that went to make Green the man he was, were largely German; in his works, as in those of the Cairds, the idealism of the Hegelian school received, with a new expression, a new lease of life. The influences that went to the making of Sidgwick, as we shall see, were, or might have been, purely English: his teachers were not Kant and Hegel, but Butler and Bentham. He tells us, indeed, that "through a large part" of his treatise on ethics "the influence of Plato and Aristotle . . . has been greater than that of any modern writer,"[1] and the intimacy and accuracy of his knowledge of Greek philosophy might well stamp him as a product of the sister University; but so thoroughly has he assimilated the teachings of the ancient moralists that he is able to translate them freely into modern terms, and to use them independently in the solution of modern problems.

Like his English predecessors and masters, Bentham and Mill, Sidgwick was interested in Politics no less than in Ethics, and he is the author of an important treatise on the fundamental principles of both sciences. Like these English moralists, and unlike the Greeks, he separates the discussion of Ethics from that of Politics. Both are practical sciences, determining what *ought* to be done, as distinguished from the positive sciences, whose business it is to ascertain what merely *is*. But "Ethics aims at determining what ought to be done by individuals, while Politics aims at determining what the government of a State or political society ought to do, and how it ought to be constituted".[2] In this separation of Ethics from Politics, of the individual from the State, or of the ethical from the political individual, Sidgwick represents the modern English individualism in both spheres of thought, and we shall see the influence of the separation upon his ethical theory.

In yet another respect Sidgwick is a typically English thinker, I mean in the practical interest with which he

[1] *Methods of Ethics*, 5th ed., 375 note. [2] *Ibid.*, 15.

invests the ethical inquiry. For him, as for Aristotle, Ethics is 'a kind of practical inquiry,' an art as well as a science. Its function is "the methodical determination of right conduct".[1] "The moralist has a practical aim: we desire knowledge of right conduct in order to act on it."[2] The interest of ethical inquiry is casuistical. It is the "particular questions" of conduct, "to which we naturally expect answers from the moralist. For we study Ethics, as Aristotle says, for the sake of practice: and in practice we are concerned with particulars."[3] "If the particular case can be satisfactorily settled by conscience without reference to general rules, 'Casuistry,' which consists in the application of general rules to particular cases, is at best superfluous. But then, on this view, we shall have no practical need of any such general rules, or of a science of Ethics at all. We may, of course, form general propositions by induction from these particular conscientious judgments, and arrange them systematically; but any interest which such a system may have will be purely speculative. And this accounts, perhaps, for the indifference or hostility to systematic morality shown by some conscientious persons. For they feel that they can at any rate do without it."[4] "The very object" of "a scientific code of morality" is "to supply a standard for rectifying men's divergent opinions."[5] "For we conceive it as the aim of a philosopher, as such, to do somewhat more than define and formulate the common moral opinions of mankind. His function is to tell them what they ought to think, rather than what they do think: he is expected to transcend Common Sense in his premises, and is allowed a certain divergence from Common Sense in his conclusions. . . . We should expect that the history of Moral Philosophy—so far at least as those whom we may call orthodox thinkers are concerned—would be a history of attempts to enunciate, in full breadth and clearness, those primary intuitions of Reason, by the scientific application of which the common moral thought of mankind may be at once systematised and corrected."[6] The final proof of the Utilitarian theory is accordingly found in the exhibition of "a natural transition from the Morality of Common Sense to Utilitarianism, somewhat like the transition in special branches of practice from trained instinct and empirical rules to the technical method that embodies and applies the conclusions of science".[7] It is because he takes this view of the function of Ethics that Sidgwick condemns the 'self-realisation'

[1] *Methods of Ethics*, 5th ed., 4. [2] *Ibid.*, 5. [3] *Ibid.*, 216.
[4] *Ibid.*, 99. [5] *Ibid.*, 211. [6] *Ibid.*, 373-374. [7] *Ibid.*, 425.

theory, and theories of that type, as indefinite; such theories fail, he thinks, to provide definite rules of conduct or to assist the moral common sense of mankind in its moral decisions.

The supremely critical character of Sidgwick's mind is apt to obscure the really constructive purpose and interest of his work. Always critical, he is never a mere critic. His analysis, however minute, is always in the interest of a subsequent synthesis. By a critical study of the various methods of Ethics, and of their relations to one another, he strove to reach the true method which should synthetise them all. His criticism is always inspired by a faith in the fundamental truth of the view he is criticising, and by a desire to differentiate the truth from the error of its statement. The criticism is therefore always from within, never from without: the theory is compelled to criticise itself. It is this quality of his philosophical criticism—its sympathetic and immanent quality—even more than its keenness and its impartiality, that entitles it to be regarded as a model of such criticism, and a model especially to be followed in all criticism of his own ethical position. For in philosophy and in moral science, more truly than even in the positive sciences, there is no such thing as finality, and the task which the great thinkers set for their students and successors is the task of critical interpretation and evaluation, rather than that of blind allegiance and slavish imitation.

In the preface to the first edition Sidgwick thus describes the purpose of his work: "It claims to be an examination, at once expository and critical, of the different methods of obtaining reasoned convictions as to what ought to be done, which are to be found—either explicit or implicit—in the moral consciousness of mankind generally; and which, from time to time, have been developed, either singly or in combination, by individual thinkers, and worked up into the systems now historical". And in concluding his examination of Common Sense Morality, in his discussion of the Intuitional theory, he says: "My sole object has been to make explicit the implied premises of our common moral reasoning".[1] His attitude to Common Sense is the Aristotelian attitude. The duty of the moralist is, by an effort of reflexion, to reach the point of view from which, without being conscious of occupying it, the ordinary conscience pronounces its judgments of approval and disapproval. This attitude to Common Sense must be carefully distinguished from that of the Scottish School, which refuses to go behind the explicit

[1] *Methods of Ethics*, 5th ed., 338.

statements of Common Sense or to systematise these statements by reducing them to their ultimate presuppositions. In Sidgwick's own terminology, the true attitude to the intuitions of the ordinary conscience is not the "dogmatic," but the "philosophical" attitude.

But there are, he finds, several points of view implied in our ordinary moral judgments: there are several "methods of ethics". "The assumption on which this treatise proceeds is that there are several ultimate ends of action, which all claim to be rational ends, such as every man ought to adopt."[1] "I have attempted to define and unfold not one Method of Ethics but several: at the same time these are not here studied historically, as methods that have actually been used or proposed for the regulation of practice; but rather as alternatives between which—so far as they cannot be reconciled—the human mind seems to me necessarily forced to choose, when it attempts to frame a complete synthesis of practical maxims and to act in a perfectly consistent manner. Thus, they might perhaps be called natural methods rationalised; because men commonly seem to guide themselves by a mixture of different methods, more or less disguised under ambiguities of language."[2] It is in this plurality of standpoints that Sidgwick finds the explanation of the inadequacy of any ethical theory which is constructed from a single point of view. "If there are different views of the ultimate reasonableness of conduct, implicit in the thought of ordinary men, though not brought into clear relation to each other, it is easy to see that any single answer to the question 'why' will not be completely satisfactory, as it will be given only from one of these points of view, and will always leave room to ask the question from some other."[3] Since, however, these various methods are not merely different but (apparently at least) conflicting, it becomes necessary to harmonise them. Along with "the different claims of different ends to be rational" is felt "the need of harmonising them—since it is a postulate of the Practical Reason, that two conflicting rules of action cannot both be reasonable".[4] "We cannot, of course, regard as valid reasonings that lead to conflicting conclusions; and I therefore assume as a fundamental postulate of ethics, that so far as two methods conflict, one or other of them must be modified or rejected."[5]

[1] *Methods of Ethics*, 5th ed., 232.
[2] *Ibid.*, 11-12.
[3] *Ibid.*, 6.
[4] *Ibid.*, 12.
[5] *Ibid.*, 6. This postulate is stated more absolutely in the earlier editions: "I admit, of course as a fundamental postulate of Ethics, that

There are three such fundamental methods of Ethics or ultimate points of view taken by the ordinary conscience, namely, Egoism, Intuitionism and Utilitarianism. And although Egoism and Utilitarianism may be regarded as two species of Hedonism—the egoistic and the universalistic—the natural affinity is not between these but between Utilitarianism or Universalistic Hedonism and Intuitionism. "The Intuitional Method rigorously applied yields as its final result the doctrine of pure Universalistic Hedonism, which it is convenient to denote by the single word Utilitarianism,"[1] while Utilitarianism, in turn, requires to be put on an intuitional basis, if it is to be satisfactorily established. The intuition of rational benevolence supplies the gap in the argument of Bentham and Mill: it completes the 'proof' of Utilitarianism which Mill had so palpably failed to provide. But rational benevolence is not the only intuition, the only rational principle of the distribution of happiness. There is also the intuitive principle of prudence, directing me to regard my own happiness as a no less ultimate good than the happiness of all. Egoism is no less rational than altruism: it has the same basis in intuition. Utilitarianism has only, so to speak, the one ear of Reason; its other ear listens to the case for Egoism. The conflict between Egoism and Utilitarianism is (within the sphere of Ethics) ultimate and insoluble, because each is the expression of the practical reason: the dualism of these principles is the "dualism of the practical reason" itself. "As regards the two hedonistic principles, I do not hold the reasonableness of aiming at happiness generally with any stronger conviction than I do that of aiming at one's own. . . . I hold with Butler that 'Reasonable Self-love and Conscience are the two chief or superior principles in the nature of man,' each of which we are under a 'manifest obligation' to obey: and I do not (I believe) differ materially from Butler in my view either of reasonable self-love, or—theology apart—of its relation to conscience."[2]

"The profoundest problem of Ethics" is, therefore, that of the relation of "Rational Egoism to Rational Benevolence".[3] Sidgwick's own final solution of this problem is, in effect, a reduction of Benevolence to Egoism. "No

either these methods must be reconciled and harmonised, or all but one of them rejected. The common sense of men cannot acquiesce in conflicting principles: so there can be but one rational method of Ethics (in the widest sense of the word method)" (3rd. ed., 6).

[1] *Methods of Ethics*, 5th ed., 406-407. [2] Pref. to 2nd. ed.

[3] *Ibid.*, 387, note.

principle of conduct is more widely accepted than the proposition that it is reasonable for a man to act in the manner most conducive to his own happiness. . . . Indeed it is hardly going too far to say that Common Sense assumes that 'interested' actions, tending to promote the agent's happiness, are *primâ facie* reasonable; and that the *onus probandi* lies with those who maintain that disinterested conduct, as such, is reasonable."[1] "I conceive that according to the morality of Common Sense an ultimate harmony between (1) Self-interest and (2) Virtue is assumed or postulated." To reach such a harmony, however, Ethics "is forced to borrow a fundamental and indispensable premise from Theology or some similar source".[2] This premise is none other than that "the performance of duty will be adequately rewarded and its violation punished," and "expresses the vital need that our Practical Reason feels of proving or postulating this connexion of Virtue and self-interest, if it is to be made consistent with itself. For the negation of the connexion must force us to admit an ultimate and fundamental contradiction in our apparent intuitions of what is Reasonable in conduct; and from this admission it would seem to follow that the apparently intuitive operation of the Practical Reason, manifested in these contradictory judgments is after all illusory."[3] In that case it would seem necessary to abandon the idea of completely rationalising morality:[4] practical reason would be divided against itself.

The acceptance of Egoism as an ultimately valid principle of conduct, or as one of three "Methods of Ethics," thus leads either to the disintegration of the ethical system into whose construction it enters as a factor, or to the final reduction of the other two methods to the Egoistic. This latter seems to be the alternative accepted by Sidgwick in his concluding chapter on the relations of the methods. It is a conclusion foreshadowed earlier in the treatise. Such a view is implied in the entire criticism of Egoism (bk. ii.). While Intuitionism of the ordinary or "dogmatic" type is invalidated—forced to exchange its own point of view for that of Utilitarianism, or at least of "philosophical" Intuitionism, Egoism is left in undisputed possession of its standpoint: only the practical difficulties which attend the application of its principle, as they attend the application of the Utilitarian principle also, are emphasised. In chapter iii. of book ii. this limitation of the criticism of the method of Egoism is ex-

[1] *Methods of Ethics*, 5th ed., 119-120. [2] *Ibid.*, 506.
[3] *Ibid.*, 507. [4] *Loc. cit.*

plicitly stated: "It should, however, be premised that the objections with which we are primarily concerned are only those that can be taken, so to say, from *within* the system; arguments, that is, against the possibility of obtaining by it the results at which it aims. We are not now to consider whether the principle of Egoistic Hedonism, supposing it to afford a practicable basis for the systematisation of men's reasoned activity, is to be accepted without reservation as the supreme maxim of conduct. . . . Whether the observance of the recognised rules of morality is for each individual the best means to this end, it will be important presently to inquire; but I shall do this impartially, without prejudging the question whether it is reasonable for the individual to conform to the dictates of Egoism or to the generally accepted rules of morality, if the two are found to conflict." [1]

In his chapter on "the proof of Utilitarianism" (bk. iv., ch. ii.) he admits that "if the Egoist strictly confines himself to stating his conviction that he ought to take his own happiness or pleasure as his ultimate end, there seems no opening for any line of reasoning to lead him to Universalistic Hedonism as a first principle; it cannot be proved that the difference between his own happiness and another's happiness is not *for him* all-important. In this case all that the Utilitarian can do is to effect as far as possible a reconciliation between the two principles, by expounding to the Egoist the *sanctions* of rules deduced from the Universalistic principle, —*i.e.*, by pointing out the pleasures and pains that may be expected to accrue to the Egoist himself from the observation and violation respectively of such rules. It is obvious that such an exposition has no tendency to make him accept the greatest happiness of the greatest number as his ultimate end; but only as a means to the end of his own happiness. It is therefore totally different from a *proof* . . . of Universalistic Hedonism." [2] And in the concluding chapter he says: "In chapter ii. of this book we have discussed the rational process (called by a stretch of language 'proof') by which one who holds it reasonable to aim at his own greatest happiness may be determined to take Universal Happiness instead, as his ultimate standard of right conduct. We have seen, however, that the application of this process requires that the Egoist should affirm, implicitly or explicitly, that his own greatest happiness is not merely the rational ultimate end for himself, but a part of Universal Good: and he may avoid the proof of Utilitarianism by declining to affirm this.

[1] *Methods of Ethics*, 5th ed., 133. [2] *Ibid.*, 420.

It would be contrary to Common Sense to deny that the distinction between any one individual and any other is real and fundamental, and that consequently 'I' am concerned with the quality of my existence as an individual in a sense, fundamentally important, in which I am not concerned with the quality of the existence of other individuals: and this being so, I do not see how it can be proved that this distinction is not to be taken as fundamental in determining the ultimate end of rational action for an individual. . . . And further, even if a man admits the self-evidence of the principle of Rational Benevolence, he may still hold that his own happiness is an end which it is irrational for him to sacrifice to any other; and that therefore a harmony between the maxim of Prudence and the maxim of Rational Benevolence must be somehow demonstrated, if morality is to be made completely rational. This latter view, indeed . . . appears to me, on the whole, the view of Common Sense: and it is that which I myself hold." [1]

If, on the other hand, we take the two principles of Prudence and Benevolence at their face value, as equally intuitive or rational, the contradiction between them immediately invalidates their character as intuitions. One of Sidgwick's own criteria of intuitive principles is that "the propositions accepted as self-evident must be mutually consistent. . . . Any collision between two intuitions is a proof that there is error in one or the other, or in both." And he adds that many ethical writers "appear to regard a conflict of ultimate rules as a difficulty that may be ignored or put aside for future solution, without any slur being thrown on the scientific character of the conflicting formulæ. Whereas such a collision is absolute proof that at least one of the formulæ needs qualification: and suggests a doubt whether the correctly qualified proposition will present itself with the same self-evidence as the simpler but inadequate one; and whether we have not mistaken for an ultimate and independent axiom one that is really derivative and subordinate". [2]

This criterion does not, however, seem to be applied by Sidgwick, as one would have expected, to his own intuitions. In his concluding chapter, as we have already seen, he finds it necessary to postulate the ultimate coincidence of Virtue and Self-interest, since the negation of this coincidence "must force us to admit an ultimate and fundamental contradiction in our apparent intuitions of what is Reasonable in conduct: and from this admission it would seem to follow that the appar-

[1] *Methods of Ethics*, 5th ed., 496-497. [2] *Ibid.*, 341.

ently intuitive operation of the Practical Reason, manifested in these contradictory judgments, is after all illusory".[1] But is not this the previous question—whether we have not mistaken for intuitions principles that are not in truth intuitive; whether each of these two principles—Prudence and Benevolence—is indeed ultimate, or may be resolved into some principle more ultimate than itself?

Now Sidgwick's own statement of the principles suggests, if it does not imply, that both Prudence and Benevolence are transcended in the principle of Justice, of which they are only the special applications. All three are principles of the distribution of the Good or Happiness, and the common mark of all is that impartiality which is of the essence of Justice. Prudence and Benevolence, so far as they are self-evident, may be stated, he says, as "precepts to seek (1) one's own good on the whole, repressing all seductive impulses prompting to undue preference of particular goods, and (2) other's good no less than one's own, repressing any undue preference for one individual over another".[2] Justice itself "lies in distributing Good (or evil) impartially according to right rules";[3] it is "the supreme principle of acting with impartial concern for all elements of general happiness".[4] If Philosophical Intuitionism differs from Dogmatic by its differentiation of the more from the less general principles, it ought to subordinate the less general principles of Prudence and Benevolence to the more general or "formal" principle of Justice. This conclusion is also favoured by Sidgwick's distinction between Prudence and Benevolence as the regulative principles of a Mathematical or Quantitative Whole, and Justice as the regulative principle of a Logical Whole or Genus. In all three principles alike "the self-evident element, immediately cognisable by abstract intuition," is conceived as "depending, in each case, on the relation which individuals and their particular ends bear as parts to their wholes, and to other parts of their wholes".[5] The principle of Justice or Equity is reached "by considering the similarity of the individuals that make up a Logical Whole or Genus".[6] Its formula is: "It cannot be right for A to treat B in a manner in which it would be wrong for B to treat A, merely on the ground that they are two different individuals, and without there being any difference between the natures or circumstances of the two which can be stated as a reasonable ground for difference of treat-

[1] *Methods of Ethics*, 5th ed., 507. [2] *Ibid.*, 391-392.
[3] *Ibid.*, 393. [4] *Ibid.*, 474, note. [5] *Ibid.*, 383. [6] *Ibid.*, 381.

ment".[1] But there are other principles, "no less important, which emerge in the consideration of the similar parts of a Mathematical or Quantitative Whole".[2] "And here again, just as in the former case, by considering the relation of the integrant parts to the whole and to each other, I obtain the self-evident principle that the good of any one individual is of no more importance from the point of view (if I may say so) of the Universe, than the good of any other. . . . And it is evident to me that as a rational being I am bound to aim at good generally—so far as it is attainable by my efforts—not merely at a particular part of it."[3] This is the principle of Rational Benevolence. But the same consideration of the relation of the parts to the whole yields the principle of Prudence, namely, that my own good on the whole is more important than any part of that good, and that all the parts, as such, are equally important. Now, we have only to ask what is the relation of a Logical to a Mathematical Whole to reach the conclusion that the one is the form, the other the content, and that the larger application of the principle of Justice which we find in Benevolence must include and transcend the narrower application of the same principle in Prudence. In other words, there cannot be two Wholes, but only one. From the point of view of the larger Whole contemplated by Benevolence, the prudential Whole is seen to be only a part after all. Justice, moreover, dictates that each shall count for one and no one (as such) for more than one. If Prudence is made an absolute principle, or co-ordinated with Benevolence, it is found to contradict not merely the latter principle, but Justice also. The only escape from such contradiction, the only possibility of reducing morality to a rational system, is by subordinating Prudence to Benevolence, through the subordination of both Prudence and Benevolence to the formal or logical principle of Justice, of which they together constitute the special application and content.

Such a conclusion is, however, impossible for Sidgwick, holding as he does that the moral Common Sense of mankind co-ordinates the principles of Prudence and Benevolence, if it does not subordinate the latter to the former. The final question, therefore, is whether this is a true rendering of Common Sense; whether, in other words, Egoism is, equally with Intuitionism and Utilitarianism, a "Method of Ethics".

Here, as elsewhere, Sidgwick's appeal is to "the moral common sense of modern Christian communities". This is

[1] *Methods of Ethics*, 5th ed., 380. [2] *Ibid.*, 381. [3] *Ibid.*, 382.

found to prescribe "duties to oneself" as well as duties to others. The former class of duties is prescribed "on the assumption that a man regards his own Happiness as an ultimate end". Nor is this a merely optional end. "We do not at all look with simple indifference on a man who declines to take the right means to attain his own happiness, on no other ground than that he does not care about happiness. Most men would regard such a refusal as irrational, with a certain disapprobation; they would thus implicitly assent to Butler's statement that 'interest, one's own happiness, is a manifest obligation'. In other words, they would think that a man *ought* to care for his own happiness. The word 'ought' thus used is no longer relative: happiness now appears as an ultimate end; and actions that tend to realise it—at least within the limits imposed by other duties—appear to be prescribed by reason 'categorically,' as Kant would say, *i.e.*, without any tacit assumption of an ulterior end."[1] "The received moral code allows within limits the pursuit of our own happiness, and even seems to regard it as morally prescribed."[2] Accordingly, the majority of those who, in modern Christian communities, have held the Intuitional view of Ethics, "would consider that the notion of human Good or Well-being must include the attainment of Happiness as well as the performance of Duty, even while maintaining that it is not right for men to make their performance of Duty conditional on their knowledge of its conduciveness to their Happiness".[3] We must, at the same time, distinguish between "moral" and "prudential" judgments, "since, though it is widely held that the ultimate obligation of all rules of duty must be rested on the self-interest of the individual to whom they are addressed—so that all valid moral rules have ultimately a prudential basis—it seems clear that in ordinary thought cognitions or judgments of duty present themselves as *primâ facie* distinct from cognitions or judgments as to what conduces to self-interest".[4] "Common moral opinion certainly regards the duty or virtue of Prudence as only a part—and not the most important part—of duty or virtue in general."[5]

We thus reach a dualism either of Prudence, on the one hand, and Virtue or Duty on the other, or of Duty itself as self-regarding and as social. "By 'duties towards oneself' are commonly meant acts that tend directly or indirectly to promote one's happiness."[6] "I hold with Butler that 'one's

[1] *Methods of Ethics*, 5th ed., 7. [2] *Ibid.*, 177.
[3] *Ibid.*, 3. [4] *Ibid.*, 27, 28. [5] *Ibid.*, 7. [6] *Ibid.*, 163.

own happiness is a manifest obligation,' independently of one's relation to other men." [1] There is thus a government of conduct by Self-love as well as by Conscience: an order of Rational Egoism as well as the order of Benevolence and Justice.[2] Now, apart altogether from the question of the hedonistic interpretation of one's own good, and therefore of one's duty to oneself, it seems to me that such a disruption of the moral life into a self-regarding and a social department, such an individualistic interpretation of one's own good and of one's duty to oneself, is open to the most serious question. The point of view of Duty is always, it seems to me, the point of view of society, never that of the mere individual. 'Duties to oneself' are, no less than 'duties to others,' duties to society—duties to the social and not to the merely self-seeking or individual self. The moral Good is always a common, never a private Good: the moral life is not departmental, but one and indivisible. The imprudent life is condemned by our moral common sense, but it is condemned as anti-social,—as bad from the social point of view, and not merely as foolish from the point of view of our own happiness. The merely prudential life, on the other hand, is condemned not merely for its stupidity and short-sightedness, but for its narrowness, its selfishness, its unsocial or anti-social character.

With characteristic candour Sidgwick confesses, in several places, the difficulty of maintaining his own view. "It does not seem to be commonly held that a man is as strictly bound not to injure himself as he is to avoid harming others; and so it is scarcely thought that a promise is not binding because it was a foolish one, and will entail an amount of pain or burden on the promiser out of proportion to the good done to the promisee." [3] Again, "it might indeed be plausibly objected . . . that under the notions of Generosity, Self-sacrifice, etc., Common Sense praises (though it does not prescribe as obligatory) a suppression of Egoism beyond what Utilitarianism approves; for we perhaps admire as virtuous a man who gives up his own happiness for another's sake, even when the happiness that he confers is clearly less than that which he resigns, so that there is a diminution of happiness on the whole". [4] Compare with this admission the account given, from the prudential or egoistic point of view, of the duties of "general benevolence". "As regards such duties . . . it would be commonly allowed that the agent's

[1] *Methods of Ethics*, 5th ed., 386.
[2] *Cf. Ibid.*, 163.
[3] *Ibid.*, 308.
[4] *Ibid.*, 432.

pain and danger are to be taken into account in practically determining their extent: it would be held that we are not bound to endure any pain except for the prevention of manifestly greater pain to another, or the attainment of a more important amount of positive good: nor to run any risk unless the chance of additional benefit to be gained for another outweighs the cost and chance of loss to ourselves if we fail. Indeed it is doubtful whether the common estimate of the duty of Benevolence could be said to amount quite to this." [1] Or take a similar statement which occurs in the "Review of the Morality of Common Sense" (bk. iii., ch. xi.): "All admit that we have a general duty of rendering services to our fellow-men, and especially to those who are in special need, and that we are bound to make sacrifices for them, when the benefit that we thereby confer very decidedly outweighs the loss to ourselves".[2] Even such a calculation, however, would be utilitarian rather than egoistic. From the egoistic point of view, no real and permanent self-sacrifice is justifiable; the good of others has no claim upon us except when it does not conflict with our own.

Yet Sidgwick shares with those who are of another way of thinking in Ethics "the sense of the ignobility of Egoism," when thus pressed to its logical conclusion. A strong aversion to Egoism "is felt by many of those who (like myself) find it impossible not to admit the 'authority' of self-love, or the 'rationality' of seeking one's own individual happiness".[3] "I do not give this as a reason for rejecting the principle of Egoism, the rationality of which . . . I find it impossible not to admit. But this 'sense of ignobility' is, in any case, a psychological fact worthy of notice." [4] And in the concluding chapter he goes still further: "I seem able to distinguish the 'sense of the ignobility of Egoism,' of which I have before spoken—which, in my view, is the normal emotional concomitant or expression of the moral intuition that the Good of the whole is reasonably to be preferred to the Good of a part—from the jar of sympathetic discomfort which attends the conscious choice of my own pleasure at the expense of pain or loss to others".[5] The selfish man "is made to feel in a thousand various ways, according to the degree of refinement which his nature has attained, the discord between the rhythms of his own life and of that larger life of which his own is but an insignificant fraction".[6] And even apart from the question of the possi-

[1] *Methods of Ethics*, 5th ed., 333. [2] *Ibid.*, 348-349.
[3] *Ibid.*, 199. [4] *Ibid.*, 200, note. [5] *Ibid.*, 499. [6] *Ibid.*, 500.

bility of harmonising the Good of the whole with the Good of the part, Sidgwick acknowledges that Common Sense refuses to rest in the egoistic view of Good. "It is, in fact, rather the end of Egoistic than of Universalistic Hedonism, to which Common Sense feels an aversion. And certainly one's own happiness is, in many respects, an unsatisfactory mark for one's supreme aim, apart from any direct collision into which the exclusive pursuit of it may bring us with rational or sympathetic Benevolence. It does not possess the characteristics which, as Aristotle says, we 'divine' to belong to Ultimate Good."[1] Yet, if Egoism be in truth one of the rightful 'Methods of Ethics,' if Prudence be an expression of reason co-ordinate in authority with Benevolence and Justice, the end to which the former points, no less than the ends prescribed by the latter, must possess the characteristics of Ultimate Good.

The result of Sidgwick's recognition of three methods of Ethics—the Egoistic, the Intuitional and the Utilitarian, as equally legitimate, is thus, apart from his theological assumption or postulate, a position which may be called Rational or Intuitional Hedonism, not Rational or Intuitional Utilitarianism. With the theological postulate it is, in the last analysis, Rational Egoism; without that postulate it is Rational Egoism *plus* Rational Utilitarianism. If, on the other hand, we invalidate Egoism, there is no difficulty in reconciling Utilitarianism with Intuitionism, and thus 'proving' Utilitarianism in the sense of showing the rationality of altruistic conduct. If the point of view of the individual and his happiness is once exchanged for the point of view of society and the general happiness; if the former is subordinated, as only a part, to the latter as the true ethical whole; if, in Sidgwick's own terminology, the principle of prudence is subordinated to that of benevolence, or both to the principle of justice, the dualism and contradiction of ethical thought immediately disappear, and Utilitarianism, or the identification of the individual with the social whole of which he is a part, is seen to be the only rational principle of conduct, the only principle worthy to be called intuitive.

The further question would, however, still remain, whether we have, even yet, reached the true Method of Ethics, whether we have not overlooked some Method, still more ultimate, implicit in the moral Common Sense of mankind; whether the point of view of a quantitative or even of a

[1] *Methods of Ethics*, 5th ed., 403-404.

logical whole is the ethical point of view. As long as the Good is interpreted hedonistically, we require principles which shall regulate its distribution, and doubtless a consistent Hedonism must be quantitative, not qualitative. If, however, the Good is itself interpreted rationally, the value of pleasure is determined by its quality, and not merely by its quantity. Sidgwick's main interest seems to have been in the question of the true method of the distribution of the Good, rather than in the question of the nature of the Good. In spite of the acuteness of his criticism of psychological Hedonism, he seems to have under-estimated the difficulties of ethical Hedonism. His investigation of the problem of the Good does not compare, in seriousness and in persistence, with his investigation of the problem of its distribution; and any reader of his work who comes to it with an expectation of finding an exhaustive enumeration and discussion of the various possible solutions of the former, and not merely of the latter problem, will be astonished to find no mention of the Aristotelian "Method of Ethics". But the consideration of this question—the question of the validity of the hedonistic interpretation of the Good—would carry us far beyond the purpose of the present article, namely, to understand the ethical system of Henry Sidgwick, and by understanding it, to earn the right and the ability to criticise that system from within.

III.—NOTES ON THE 'WELBY PRIZE ESSAY'.

By V. Welby.

Part I.

In attempting some notes on the admirable Essay which the Welby Prize has been so fortunate as to secure,[1] I shall confine myself to the simplest and most practical of the many aspects of its subject: leaving it to others better equipped for the task, to treat of its philosophical and scientific value and bearings.

The first point therefore to take is the Essayist's view of the best way of securing the objects to further which the Prize was offered. This is excellently well expressed in his contention that it is indispensable to create for thinkers (and I should add, for all men, since all are listeners if not readers, and all have to act upon what is said or written) "at the beginning of their career, a clear and strong consciousness of their power over their material, of their free disposal, not only of sounds and other signs for the notification of concepts, but also of ideas for the formation of concepts".[2]

I have myself ventured to protest in many forms against the absurd assumption that from our birth we are inevitably delivered over to an abstract entity called language, occupying a throne of irrational despotism, and that we remain till death its hopeless slaves. For the practical result of this notion is that emancipation is only in the direction of slang, or deformities introduced by those least worthy to have any authority in questions of expression, and brought up in complete ignorance of the transcendent value of language and of its pressing concern for every one of us. Those who have begun to learn how great is the need for more intelligent general interest in this subject, must welcome an effort to restore to man a rightful power of will in this matter, both individual and social: especially when the idea of will itself is at the same time subjected to examination from a

[1] Mind. N.S., Nos. 31, 32, 33. [2] P. 290, § 1.

new point of view. And the authority to which some day we shall all, even the most *wilful* of us, be glad to defer, will, as Dr. Tönnies says, be found in that "great alliance which runs through all nations, the Republic of scholars": since "to work in and for this," with all that such work implies, "has always been the highest aim"[1] of the leaders of thought.

It would indeed be ludicrous were it not so pathetic to see men from whom we might expect better things, unable to imagine any organisation of the vast and largely unutilised resources of language which should not mean some artificially imposed and pedantic fixity of expression. As a fact the result of bringing an intelligent and conscientious social will to bear on questions now wrongly called 'verbal' (which has to do with form, sound, arrangement, etc., of words) but really 'sensal' (which has to do with their value) would be, that we should at once begin to acquire a freedom from conventional shackles which as yet is out of the question, as it could only lead to greater and yet greater confusion and impotence. At present, affecting to despise 'mere verbal points' and relegating the study of linguistics to the specialist whose interest is always narrow and often merely technical, we even tend, as Dr. Tönnies points out, to confound the power to form concepts at will with the "mere determining of the meaning of a word". And yet, as he declares, we have here the source of that command over the solution of ultimate problems of which hitherto we have—and no wonder—despaired. What is needed for this great work is no wealth of wayward fancy, no mere brilliant dreaming, but a noble, fervent, and loyal imagination: content to serve, to transfigure, to glorify scientific truth and experimental fact, thus endowing science herself with her highest powers.

The analysis of the nature of Signs must of course be psychological: and to say truth I am unwilling to see it carried very far until we have more fully realised the unfortunate tendencies of the only psychological metaphors which convention at present allows us to use. These of course were originally quite consistent with the accepted views of the world and of man, and therefore were not merely harmless but often vividly helpful. Now it is hardly too much to say that they one and all tend to vitiate instead of expressing or illustrating our thoughts or aspirations. It is not however either possible or desirable to enter here upon this large question, which presses for treatment on its own

[1] P. 291, § 1.

merits; and I will only add that no one would believe without long and special study how great and wide-spread may be the mischief done by the survival even of one obsolete metaphor. We are constantly told that inherited metaphors are rendered harmless by long use, as no one now attaches to them the mental pictures called up when they were first circulated. In one sense this is of course true: but in the first place most of them are still far more active in misleading us than we have yet discovered, as can easily be demonstrated by many examples of their effect upon the arguments, even of the ablest writers: while in the second place, language must increasingly suffer from the loss of this pictorial element.

For "natural thought is metaphorical, that is, translates the unperceivable into sensuous pictures": [1] and this process undoubtedly goes on, and actively too, when we least suspect or desire it. I have been amazed to find how little aware even thoughtful minds are of this. But then the attention of no one has yet been called, as a main part of mental training, to these sources of danger. And the loss thus caused is incalculable. May it soon cease! For to use a wrong metaphor is like using a wrong implement. Happily natural metaphors refuse thus to play us false (although of course our dulness may misinterpret them). Unless we morally train ourselves to act a part, the smile and the tear are true 'signs' of what we are 'feeling'; translating the unperceivable 'emotion' itself into visible 'expression'. Meanwhile I would venture to suggest certain considerations as to the proposition that "a certain word has a certain meaning, *i.e.*, it is a sign of a certain (perceivable or thinkable) object, according to the will of one or more persons". [2] For we here encounter the question of context. As the writer reminds us, the development of language from the gesture stage to the sound stage and thence to the writing stage (through the pictorial) stage, has involved a self-reversed relation. For written language lacks even the help of intonation and modulation: and custom and training alike forbid us to supply their places by any of the many devices which graphic methods would furnish. Mr. J. H. Choate's suggestion (that written language is still in the stage of musical homophony and that it is high time we initiated a system which answered to polyphony, to the chord and to orchestration) has at least the merit of illustrating the need and feasibility of similar developments.

This would greatly affect all questions of context. Even

[1] Pp. 294-295, § 3. [2] P. 297, § 13.

the German fashion which sanctions in the most serious writing the free formation of compound words and the use of different types to indicate the master-words, would do this better than our iron monotony, which, with a wholesome but often excessive horror of emphasis has only the weak-looking 'italics' for this purpose.

We seldom reflect how much imagination our writings demand from their readers: how much more of it than we suppose the average of these must have, in order to understand or enjoy writing at all. Unfortunately they demand also an amount of interpretative power which does not exist: hence some at least of the endless misreadings of which authors complain. Surely in this our highest form of expression we ought at least to recover the expressiveness of gesture. Something which makes for that much-needed quality may some day be hoped for. Thus the context would become illuminative and not as it often is now, merely coercive. But in any case it is coercive: so much so that surely it would be wise to say that a certain word (with perhaps some few exceptions) has but a certain *core of* meaning, from which indeed its variations in value must start. This of course is the condition of dictionary definition, which however itself generally leaves something to be desired. And above all it seems almost invariably forgotten that while we do, if we think of these things at all, make some allowance for the power of its context over the meaning of a word, we rarely if ever make allowance for the power of a leading word in a sentence, a paragraph, a chapter, on its context: although this corresponds to the influence of a 'shibboleth' or party-cry on a group of persons who are banded together in support of some 'cause'.

As to the part which individual 'will' plays in this connexion, I must confess that many of my own words are used with a silent protest: I am sadly conscious of the associations (the very ones which I desire to outgrow) which dominate them. My 'will' would incline often to use words and phrases which, as things are, could only sound perversely or ignorantly grotesque. And these would be thus useless: since no one now is prepared to suffer some strangeness for the sake of a new or good idea or of raising some question in an entirely fresh way which might bring us to unexpected answers. It is indeed not so much writers and speakers who have to be trained from the first years of infancy in the splendid work of developing our powers and means of signifying and interpreting, but the great world of hearers and the growing world of readers. It is most true

that "by understanding, a social will issues from the individual will,"[1] and that social validity it must have. But here, alas, the greatest difficulty arises, except in that very case where difficulty would be desirable. Senseless changes, wanton waste of valuable association or analogy and so on, are quite easily introduced, probably by those who are sophisticated in the worst sense: those whose minds are tainted intellectually on the one hand by forms of pompous conventional vulgarity, and on the other by the ignoble standards of speculative trade or even of the betting and gambling worlds. As to the perverse and mischievous changes, even scientific writers will for instance, use 'phenomenal' to mean exceptional, just as they now use 'atom' for some divisible particle, and speak of *rudiment* when they mean its converse, *vestige:* while philosophical writers or essayists of the first rank will confound separation and distinction, poetry and verse, fancy and imagination, imagination and conception, etc., etc.

But then the question, Why should this word be used and not that? as yet seems only to be asked either by those whose only idea in this is to keep locked the fetters of unintelligent convention for the restatement of second-hand idea in orthodox form: or else by those who, despairing of all beauty, greatness, widening truth of thought, substitute for these mere graces, skill, charm or 'preciousness' of Style, —the elaborate stained-glass window for the glorious landscape, the light and the air, which were the very reason for the making of windows. But after all, stained-glass windows have a glory of their own, and a use too where the outlook would only be on some squalid rubbish-heap. Only, as it has been well said, when language is to be used to conceal lack of thought, it is too often twisted and wrung out of the dictionary to result in the mere pleasure given by deft tricks and mannerisms. Even the proverb or current saying, simply reversed, attains the honours of epigram. Meanwhile the essential continuity of evolution in this as in other forms of vital activity, is still (as I have elsewhere urged) virtually if not directly denied. As Dr. Tönnies says, the idea of an absolute gulf between the language of man and that of animals[2] needs for its completion that between men who write and men who cannot.

The significance of the existence of language within

[1] P. 298, § 13.

[2] Among which it now appears we must reckon that of fishes! See *Cont. Rev.*, August 1900, p. 218.

language: of patois, of dialect, of 'patter': language belonging to a school, even to a family of children: the 'little' language of mother and babe, the scientific notations, the professional vocabularies, the sailors', the shepherds', the costermongers' lingos, the jargons, slangs, etc., is understood by few. The fact that we have language on many levels, some of them little differing from what may be called an animal one, at all events disposes of the absurd notion that, even if convinced of the advantages to be gained by adding to our store and modes of expression, nobody would take the trouble to do it. Even the recent development of a strong demand for dialect stories proves at all events that very few grudge the trouble of following unfamiliar forms of speech if only these are expressive and pointed, as dialect generally is.

If we would understand the different senses in which it may be said of words or other social signs that they have a 'meaning' we must also understand the nature of the social will. The contrast drawn in the Essay between that utterant will which acts from feeling and the one which works from thought, is instructive. The feeling and thinking wills have different ends, the former being mainly unconscious and the latter conscious.

The analysis of traditional superstition is luminous: as also the definition of the way in which we learn to give predictive meaning to certain signs.[1]

The author's description of the legislative action of science over its own technical terms may I fear be shown to be as yet but little deserved. Certainly in England, and equally in the translations of scientific writing which I have seen, nothing is more striking than the loose and inconsistent way in which many even leading terms are used. Many scientific men have complained of and rebuked this tendency, but so far, it appears, without much effect.

When we realise that in fact the crudest languages are just those "burdened with a superfluity of synonyms,"[2] we see that an advanced language ought gladly to utilise these 'synonyms' for expressing subtle distinctions the need of which is continually growing as the racial experience widens and new wants are created. But at present, as it would be easy to show, we are on all sides allowing this treasure to run to waste.

For what Dr. Tönnies calls a "special or heightened meaning,"[3] as the result not only of reverence or 'inspi-

[1] Pp. 301-302. [2] P. 309, § 42. [3] P. 310, § 44.

ration' but of a sense of great moral or rational issues, I would always reserve the noble word Significance. And here it may perhaps be suggested that while such a conception as the Logos may of course be held crudely and literalised or crystallised into 'dogma,' a time may come when we shall be glad to have seen at least in this form that the Word of the Speaker is more creative, more sacred, more powerful than our usual ideas of language imply. If the orator, even as we have him now, can awaken in his hearers a force of enthusiasm and resolve which may help to change the very face of the world and the whole course of civilisation, or may as we say "melt the hardest heart,"—sometimes the harder task:—if the words in a Book can so sway mankind through the centuries as to be known *par excellence* as 'revelation' and to be almost worshipped by multitudes, we may be sure that Expression, in forms which as yet we can only dimly imagine, will in some sense justify usages in which at present we see either mere dogma to be unthinkingly accepted by faith, or the survival of naïve myth.

Thus again, while "apart from its personification of the inanimate, the economy of language treats all processes after the analogy of animal" and human activities, and these interpretations, handed down in philosophy, "penetrate deep into the sciences"[1] and are hard to weed out again, we may find whenever we begin to test and sift the comparative value of analogy and metaphor, of parable and myth, that with the weeds are hidden as it were rare and precious plants.

The question of extensions of language in the direction of unicodes and other like 'signs of signs' all depending on the action of a healthy 'social will' cannot here be entered into. But this and all other indications now crowding upon us of a coming expansion of our means of mental intercourse—so far behind our means of material communication—cannot but be welcomed. Like other authorities Dr. Tönnies considers that for many reasons English is likely to become, especially for business purposes, a universal language.

The relation between a leading concept, its definition, its characteristics, and the use of metaphor to describe its nature, needs perhaps a special treatment by so able a writer as Dr. Tönnies. To take the case of what may be called the ruling figurative definition of language, that of *current or sterling coin*, we find him seriously defending the use of this image. It is indeed as he says "almost traditional in philosophy to compare words with money": but he also claims that "the

[1] P. 312, § 46.

analogy is far-reaching". It is of course indisputable that "it is essential to the word as to money that it is a sign and that it shall be valid". But the Essayist carries his comparison much farther, and extends it "to the different senses in which money like the word has 'meaning'".[1] In the one case it is coined money, in the other, paper money. But we never speak of words in connexion with 'notes' or 'bills,' although no doubt word and money alike develop out of what is not yet either.

After his analysis of the evolution of modern systems of currency Dr. Tönnies gives us a classification of "the many senses in which we can say of a word or other sign that it has meaning".[2] This is first of course, as he says, *intention*. Though curiously few know it, in English the very word simply 'intends to convey' this.

But there is no need here to follow this admirable exposition. I would only venture to suggest that the figure 'coin' as applied to the 'word' is unfortunately inapplicable in some important particulars. In the first place we do not arrange coins (or even cheques, notes, bills, etc.) with reference to resultant beauty or charm, or in ways answering to brilliant eloquence: then coins are not added to or shortened as words are and have no constituent letters to be modified in sound or spelling: they are without that multitude of varying associations which the first sight of words calls forth in different persons: neither do they change places as words—*e.g.*, simple and silly—do. Again, coins consist of a number of objects of precisely the same value each in its own class, whereas words vary much in value within each class. As Dr. Tönnies himself reminds us, coins are signs of a standard 'unit of measurement,' which certainly words are not. If the analogy held good, the meaning of words like the value of coins would never vary except in degree. Then you cannot alter the value of money by warmth or coldness of tone, by a tearful or stern or smiling face: or again by underlining it or printing it in capitals.

But a more important objection remains. We cannot reconcile this metaphor with what I venture to think the truer ones. Our own language considered as an 'innate organ' suggests words as its 'cells': language can be "damped and kneaded into a dough," which figure connects it with plant-life: 'word-painting' is anyhow quite inconsistent with the idea of coinage. Instances might be multiplied. But surely

[1] P. 324, § 55. [2] P. 326, § 56.

enough has been said to show that the analogy between money and language, coins and words, belongs to that large class in which we have one or two common characters or qualities which correspond, while many others,—some of crucial importance—differ completely.

These analogies may be allowed to pass in colloquial intercourse: but surely the only ones which philosophy or science or indeed any serious writing can rightly employ are those in which if not all, at all events the main characteristics of the two factors, are really analogous.

It might of course be rejoined that the analogy as worked out in the Essay is manifestly only applied to one special aspect of language, ignoring all others. But the fact that this is possible and even easy in this and many similar cases is surely the very thing which constitutes its greatest danger. The ordinary reader does not think of the narrow limitations of such a comparison: he applies it vaguely to the whole subject. And even the warning given us that one particular part of the analogy cannot be carried into detail must needs encourage the idea that in all other cases it can.

Part II.

Having thus thoroughly examined into the nature of 'Sign' and its 'Sense,' we now inquire into the reasons for that disastrous obscurity and confusion which makes the study either of psychology or philosophy increasingly sterile. As the Essayist tells us, throughout Europe and America, even the ablest writers start from or work with concepts differently determined: and are not even constant to, or their arguments consistent with, their own definitions of their leading terms. This, as he shows, is an evil long since complained of: and he does full justice to that great but abortive effort to compel language to take on the automatic precision of mathematics, which the seventeenth century gave us.

In those days, as now, it seemed to the thoughtful that philosophical disputes would end "if only there were unanimity as to the meanings of words," since many disputants never understood each other at all. But Dr. Tönnies wisely remarks that then as now, much rarer was the perception "that a difference of thought lies hidden under the same expressions".[1] That is indeed quite as frequent a cause of dissension as its opposite.

[1] P. 470, § 66.

Again, much of the anarchy in philosophical terminology results from the unconscious absorption into philosophical systems of strong party views and theological or anti-theological prepossessions. And never shall we learn to allow for this probably inevitable source of difficulty until we have set ourselves in earnest to attack the enemy in his citadel and to master the whole subject of Sign and Sense in a new spirit.

The "remarkable interaction between the names for physical (objective) and psychical (subjective) processes" does indeed from this point of view need a fresh and exhaustive study. At present we accept the traditional usage or we add arbitrary usages of our own apparently without a suspicion that all the time there may be groups of phenomena 'mental' and 'material' of which the correspondence is as 'real' in the sense of actually existent as that of the corresponding points in vision or the mechanical equivalence of heat, or indeed as that in any admitted equation. And here we may especially note "the habit of denoting a grammatical subject as 'thing' while thinking of things as spatially extended or corporeal".[1] For surely the predominance of the inherited tendency to static or spatial methods of describing the psychical is responsible for much of our difficulty in questions of the 'soul' or 'immortality'. These may assume unlooked-for aspects when we begin instead to apply the dynamic order of figure to the conscious sphere, and regard soul, mind, self, not as analogue of body in the sense of mass or structure, but as analogue of that primary complex-forming energy which (in whatever sense) we recognise as vital.

The loss of neo-Latin as a universal scholar's language is of course a serious one: but is there not reason to fear that its reintroduction might tend to create worse evils than even those which it was meant to cure? For it would accentuate the present tendency to use only archaic figures of speech: and would also, unless the greatest vigilance were exercised, fasten yet more firmly than at present the fetters of the formalist.

However of course a real new birth of interest in Expression, a real appreciation of the tremendous issues involved in its exaltation or degradation, ought to avert any such misfortune. With regard to differences of thought, "differing principles, opinions, theories,"[2] Dr. Tönnies insists that a common terminology is not only possible but indispensable

[1] P. 473, § 68. [2] P. 479, § 72.

for arriving at any decision between them. There has undoubtedly been a process of simplification, alike of thought and language, due chiefly to the influence of the mechanical interpretations of physical science. "The whole tendency opposes man to all the rest of nature."[1] But "a very marked reaction against the rationalistic-mechanical tendencies is just appearing. A vitalistic impulse is again disturbing the biologists."[2]

Into this difficult and momentous question it would almost seem waste of time to go, until there has been a thorough revision of our means of expressing it *and therefore of thinking it*. For example, the concepts of Rest, Identity, Being (and all others belonging to the same category) are undoubtedly, as the writer says, being replaced by those of Motion, Change, Becoming.[3] Only in both cases, the terms used, with associations aroused by them which have now only a historical interest, completely dominate our thought, with the result that we argue round and round in a circle and 'get no forrarder'. And "it must be noted most carefully how" (for instance in the conception of life as the combination of reproduction and destruction, of the activities of life as a 'dying') "the regenerated Aristotelian concepts harmonise with the concepts of modern physics. For what is energy, which is now accounted the true reality, but capacity, inclination, tendency (or whatever it is called) to perform work?" But most truly "this whole renewal of thought is of the deepest importance for Psychology". There is now "no ground in the given facts for the separation of subject and object,"[4] still less for the use of the insufferable anomaly of the internal and external. Both are simply remnants "of the old belief that the soul has its seat in the body as another being". And at all events it is well that our falsities should be challenged by the assertion that "the actual facts are sufficiently described by saying that the body perceives itself and reacts upon itself, *i.e.*, as a whole upon its parts. We may give the body, so far as it is subject *i.e.*, psychical fact, the traditional name of soul."[5]

I would venture to suggest that some objections to this statement will probably be found to rest upon those very survivals of even primitive animisms which the state of language prevents our discovering in thought philosophically or theologically or even scientifically orthodox. Others may be due to the too common confusion between separation and

[1] P. 480, § 73. [2] P. 481, *ibid.* [3] P. 485, § 75.
[4] P. 486, §§ 75-76. [5] P. 486, § 76.

distinction. In any case a terminology really in harmony with the knowledge so far attained by mankind must be, as we are, in conflict with a terminology which belongs essentially to a bygone age and to discredited theories. As to the "obstinate persistence of the view that intelligence belongs to the essence of the soul,"[1] may it not be possible that here again we have a difficulty created by the very words in which the 'opposing views' have to be expressed? Remove the barrier which *separates* thought from sensation, leave only the distinction without which no discussion is possible, and you will find yourself able to redefine, nay, to reconceive the facts and relations of intelligence and thought, in the light of the biological concepts of involution and evolution, of growth and differentiation: yes, and even perhaps of fertilisation and protective mimicry! For most assuredly there are innumerable processes "which denote psychical life just as they do physical life"; but which, being left outside and unnoticed "do *not* get their appropriate validity and naming".[2] And that, it must be remembered, starves not only psychology but the imagination and the vocabulary of the poet. Time that he too began to see the precious gems for *his* setting that lie in many a (to him) unknown, because 'technical' scientific treatise.

But "it is chiefly the doctrine of the will which suffers from this as from the dependence of terminology upon customary language". Most certainly this is so. And, as I made bold to suggest in 1887 (in an unpublished paper called 'Mental Biology'): "A psychical organism within the soul, like the cerebrum within the body, is formed as a complex tissue of possible and actual connexions of sensations, a tissue of which the essential functions are the positing of likeness and difference, *i.e.*, are assimilation and separation, reception and rejection, affirmation and negation, completing itself in man by the possession of a sign-system of words as the function of judgment, and so as thought".[2] I am indeed profoundly grateful that at last a suggestion which I saw long since must contain an important key to our chaotic ideas of soul and of will has now been thus recognised, ably expressed and applied to the ordering of these and like ideas.

The criticism of Prof. W. James which follows[3] seems to me entirely justified; for these 'arbitrary (and inconsistent) limitations,' largely owing to the failures of language, issue in sermons like those on the "Will to Believe," which

[1] P. 487, § 79. [2] P. 488, § 80. [3] P. 489, § 81.

are unfortunately vulnerable just where we most need their eloquently pleaded lessons. And the strictly scientific thinker is no better off. The physiologists' idea of the will virtually makes it "after the fashion of the Cartesian soul, a rational person within the body"; it sends orders, etc. Or, like Huxley, they class it as one of the "mere by-products of the vital process, reacting in no way upon it. They differ from the Identity-psychologists only in the obstinately maintained prejudice that only the objective or physical is 'real,' *i.e.*, they differ fundamentally only in *terminology;* for no one has ever been able to say in what particular sense the former has a *right* to be called real, while the psychical 'accompaniment' has not."[1] Yet I suppose that there is in fact one 'particular sense' in which the physical has an exclusive right to be called 'real'. It lies in the power to reproduce physical phenomena in the laboratory or its equivalent, without hindrance from the 'personal equation,' which must always introduce the element of uncertainty into every psychical experiment on volitional activities.

Dr. Tönnies has in any case fully understood "the value of this concept for the understanding of undoubted facts, *e.g.*, of the facts that for every one something becomes the sign or mark of something else, without being that by nature"; [2] while he warns us throughout that what we have to say is made very difficult by the fact that we can express ourselves "only in words which already mean something else".

Part III.

Dr. Tönnies here begins by an assumption and a question. "Terminology is a production of human will, but thought and knowledge itself are also activity wherein will expresses itself. If an energetic and homogeneous will of uniform aim were given to psychological and philosophical knowledge, then unanimity of thought would soon take shape in unanimity in naming. Why is not that will given?"[3] He rightly describes the absence of unanimity as pathological. And the general notion that it is easy to talk of our experiences and feelings, and that it does not pay to pursue the subject scientifically, fosters this state of things. There is no doubt also that physical science has so to speak invaded and devastated the realm which is supposed to include metaphysic: while this again is conceived as a ghost- or dream-

[1] P. 490, § 81. [2] P. 491, *ibid.* [3] P. 46, § 82.

land which is dissipated like mists before the sun. But what is the consequence? Philosophy, credited with (or burdened by) forms of theology of which it is naturally independent, avenges itself by choking the harvests of science with rank growths of language-weed. Not merely the professed metaphysician but the scientist "stumbles upon premature ill-considered judgments, owing to the lack of clarified concepts of those objects of thought the *names* of which are in every one's mouth, such as cause, end, necessary, fortuitous, possible, impossible, perfect, unity, true, order, space, etc." [1]

If Wolff were now living, he would, Dr. Tönnies thinks, be preaching a wide extension of our present idea of the possible functions and the ultimate limitations, of language. Probably however it is well that such a crusade, in the form it would then have taken, is no longer possible; as the march of events and the easier communication between various races all over the world, to say nothing of the development of physical science, must give a different and more hopeful direction to our efforts than has hitherto been practicable. And moreover such work will now as never before appeal to every man—to whatever type he belongs—who does not deliberately prefer the unmeaning and the senseless, or whose mind rises at all above the level of imbecility. But as it is, Dr. Tönnies rightly urges [2] that we have to fight as it were backwards; and shows the absurdity of being reduced to bad metaphysic because the way to valid thought is blocked on the one hand by science, and on the other by traditional theology. He gives an excellent analysis of the idea of 'responsibility,' [3] which is itself 'responsible' for much false thought, and reflects itself in the fancy that men allow themselves to be determined in their practical relations by psychological theories.[4] But, as he remarks, "the ultimate ground of this mistake is that lack of sociological, and therefore also of psychological, insight, which in its application to political maxims is still always held to be competence".[5] Thus philosophy is accused of being both reactionary and revolutionary: and her history is taught,—as a catalogue of "vague schemes and fancies".[6]

In considering the question of remedy for all these evils we must realise as above remarked the increasingly international character of the problem. Happily mutual under-

[1] P. 47, *ibid.* [2] P. 48, § 83. [3] P. 49, § 84.

[4] He alludes here significantly to "those who speak under the spell of language". This paralysing spell needs to be broken!

[5] P. 50, *ibid.* [6] P. 51, § 85.

standing and co-operation are strongly promoted by "the conditions and means through which the intercourse of the world is carried on to-day". The United States are attracting "the accumulators of the power of thought". So also to some extent with the colonies of the British Empire. And "in proportion as in the new world an inward concentration is gained for serious thought, Europe may expect a reflux of new results". It is in truth "inevitable that we should become more and more conscious of the hindrances of a different terminology, especially in so far as they have been conditioned by those national limitations; but also that we should feel more and more strongly the need of a common *language*".[1]

The proposals of Archbishop Wilkins, of Descartes, and of Leibnitz, who "pursued these world-ideas with ominous confusion,"[2] have as yet borne no practical fruit. But even in rational schemes once smiled at as Utopian (just as the idea of a great development and extension of linguistic facilities is now derided), we have seen rapid progress: *e.g.*, "the postal union, the metrical system, the Latin coinage convention," etc. "In all these cases we have to do with the relations of symbols to a more comprehensive system, with the determination of units of measurement by a more universal will."[3]

And all such ideas do inestimable service by pointing in the direction which promises good result. "We must will the highest, we must seek the apparently impossible. A system of concepts is conceivable, which would present in their natural order all possible ideas in so far as they can have formal value in philosophical judgments, which would establish their relations to one another, their dependence, kinship, contrast, but would develop all from simple elements which are accepted as belonging to the common consciousness of humanity."[4]

And as I have often ventured both to suggest and to illustrate, we must introduce the idea of assigning to the elements of such a system one of linear diagrams so that "complex thoughts could be compounded out of them as geometrical figures,—plane, spherical, and spatial".[5] Other mathematical symbols would of course be available: but a symbolic system resembling the Chinese might also, as the present Chinese Minister has pointed out, be a useful auxiliary.

[1] P. 52. § 88. [2] P. 53. § 89. [3] P. 54. § 90.
[4] *Ibid.* [5] *Ibid.*

Of course for all this we must develop some centre of authority which shall register and circulate the results of all the best thinking on the subject of Expression in the whole civilised world. Such an authority would neither hamper nor override the freedom of true philosophy, of true science, of true literature: it would never dream of dogmatically imposing rules which tended to stiffen or to contract the energies of a 'living' and growing language. It would indeed even encourage in some directions a certain disdain for binding regulations which have really been forced upon us for the convenience not of the thinker or the man of action, but of—the Printer. It would admit that we might well allow some greater latitude in written correspondence than would perhaps be convenient or economical in printed books: it would rejoice even in the increasing tendency, at all events in England, to write the dialects of childhood and local forms of speech not merely in altered spelling, but without the disfiguring addition of inverted commas where letters were to be left out. And this last reform would appeal even to our tyrant the printer!

I will not attempt further to go into the great conception of an International Council of Reference (as, to avoid certain associations connected with modern 'Academies,' it might perhaps be called) which Dr. Tönnies gives us in his last pages: but will only quote with warm sympathy and gratitude some of his closing words. Under whatever form we acquire a nucleus for efforts to render language more efficient and its users more conscious of their linguistic obligations and privileges, it must "by the fulness and wealth of its life" supply a vivid contrast to any dead machinery of official pedantry. Its programme will be based on an ideal of practical interest for all. "Now this idea lies, as hardly any one of note among the sociologists can doubt, as it were in the air of our age. It is the overvoice to all the instruments which are played upon in the economic, the political, and spiritual life of our century. On the threshold of a new century it may perhaps give the note to this concert."[1] Whatever form again this new 'concert' may eventually take, we may be certain that if we work steadily and patiently for it, never losing sight either of the sublime greatness of a work which aims at nothing less than enriching and exalting man's distinctive power of speech and thought to an undreamt-of degree, or of the importance of details which we have too scornfully ignored or ignorantly neglected, our

[1] P. 56, § 92.

descendants will bless us for leaving them a heritage of which they will have learnt the transcendent value, and which must through the ages grow under their hands into a power which may even interpret afresh the ancient Figure of the Divine and creative WORD of GOD.

Towards such a consummation, this masterly exposition of a theme which though as yet hardly recognised in its true grandeur will to coming generations be familiar, must tend to contribute. Let us hope that it will only be the first of a long series of such appeals, arousing more and more of that active and experimental interest which alone can turn a fruitful conception into practical fact.

NOTE BY PROF. TÖNNIES.

THE writer of the Welby Prize Essay is very grateful to the author of these Notes (who is at the same time the donor of the prize) for having so carefully examined the Essay, and for enlarging its purport by supplementary comments and some well-considered objections.

V. W. goes straight into the practical side of the subject. The critic's leading thought is emancipation from traditional forms of expression, no longer adequate to the very purpose for which they are destined. The general aspect of this idea did not seem to me to be an immediate object of the question of philosophical and psychological *terminology*. But I fully recognise that it may be represented in this way. The transition from the need for improving the technical idiom of thinking to the more general need for improving the language of conversation and literature is indeed an inevitable one, as long as the former is considered as a *part* of a given empirical and 'living' language. The language of chemistry, however, may keep free from all influences of common talk; for as common talk derives all its chemical knowledge and expressions from the science of chemistry, it gives very little, it receives almost all. Not so with psychology and metaphysics. Ordinary speech of educated people and general literature is full of psychological and metaphysical notions, not (at least consciously not) drawn from any system of philosophy, but claiming to be founded in nature or in common sense or—in language itself. Therefore, as long as philosophical language is not sharply marked off from general language—as long, in other words, as a writer uses words of this general language indifferently, as if they were sure to be rightly understood by any one *knowing* the language—so long the confusions and obscurities

of this general language will go on to creep into the very systems of philosophy. And consequently if you appeal to philosophers to express themselves more strictly, more unmistakably, this appeal will fall short of success, unless a general rule be accepted to express themselves in all things whatever more strictly, more unmistakably, less ambiguously. It would, therefore, be an excellent object for a special research—more sociological than either psychological (that is referring to *individual* psychology) or linguistic in its purport—to inquire into the sources of lax and careless ways of speaking and of ensuing constant or frequent *misunderstandings*. In this place there may be said so much as this: All sorts of misunderstanding, whether intended by the speaker or no, if lasting and operating in people's minds, are symptoms of a deep-rooted corruption of social life.

> "Et la pale famine et la peste effroyable
> N'egalent point les maux et les troubles divers
> Que les mal-entendus sement dans l'univers."
>
> —(Boursault).

And, like everything hurtful, it is made worse by the intent to do harm, *viz.*, by using words and phrases with a view of "concealing one's thoughts" or at least with a wish and hope, that they (the words) will be understood so as to have a certain effect desired, although the speaker *owns* but a different sense and keeps himself free from all "*responsibility*" whatever (as in this case is very properly said).

As a matter of course, any attempt at improving language presupposes that we are determined to make ourselves understood and to understand each other, as perfectly as possible. Therefore it is only the misunderstandings, involuntary on either side, with which we are concerned. And here it is most justly and meritoriously emphasised by V. W. that very much might be done and ought to be done in order to avoid misunderstandings, (1) by developing and organising all modes of expression, (2) by training ourselves and particularly by training youth to the careful interpretation of these modes, for distinguishing the different sorts of sense, meaning and significance, for *evading* the dangers hidden in all imagery and rhetorical figure. I confess that I had not realised, ere I became acquainted with V. W's fervent aspirations, what a wide area here opens itself to *educational* improvement.

I also consider it to be a solid enrichment of my discussion on the validity of meaning, what V. W. points out as to the

power of context[1] and of leading words[2] over the meaning of many words, that have "but a certain *core of* meaning from which indeed its *variations* in value must start".[3] And it is true, what my critic says, that *written* language as it is (and perhaps English more than other) lacks nearly all the help for making 'sense' understood which spoken language possesses, and that here is a wide field for improvement. The critic passes by the question of *punctuation*, which was originally an instrument—rather a poor one indeed—for indicating the way a writer *wished* his sentences to be read. How little has been done to develop this instrument from its infant state! Even the *application* of this weak instrument is far from being regulated; it is by custom different in different languages; so that in order to read a foreign language correctly, although we need not learn, at least if it is a language of western civilisation, a new alphabet, we must learn a new punctuation, unless we are willing to forego its use altogether, as probably most people do. All this, however, concerns the meaning of sentences, periods, or as V. W. says, of context, and but indirectly the meaning of words. The critic returns to this theme (p. 8). As to the legislative action of science, I wished to describe the ideal of it, not the reality, which however, in some at least of the natural sciences, for example in astronomy and chemistry, comes near to what may be considered as a model. As to *synonyms*, I believe, it may be sadly confirmed from German experience, that "we are on all sides allowing this treasure to run to waste".[4] Especially as exaggerated and ill-advised aversion to "foreign words" tends to expel these, and together with them the *specialised* meanings attached to those expressions, without substituting or forming indigenous words equally fit for carrying the associations needed.

I fully appreciate the elevated presage as to the Power and Significance of Word, indicated on page 194.

But in dealing with the "Analogy of Money" I did not mean to defend the use of an *image*;[5] and I am, no less than the critic, aware of the mistake it would be to "define language figuratively"[6] by that analogy. I only wished to point out, that among the many social symbols, consensual and conventional, all of which are very much *dissimilar* from words, are inferior to and even dependent upon them, there are some, and those playing a most important part in empirical civilisation, which have certain characteristic traits in

[1] P. 190. [2] P. 191. [3] *Ibid.*
[4] P. 193. [5] P. 194. [6] *Ibid.*

common with words, and are well calculated to *illustrate* the essence and power of different forms of social will. These are the tokens of economical value, that is, of *value in exchange*. Like words themselves, they bear, in an *eminent* sense of the word, a *social* character. As words go from brain to brain, so tokens of exchange-value (money, its predecessors and its substitutes), go from hand to hand—carrying a *meaning* with themselves, besides what they "are" —that is, requiring to be interpreted intellectually beyond what they appear to the senses—and, of course, this meaning signifies a reference to "brain action" (that is to reasoning) as well in the case of money as in the case of words. This, indeed, I ought to have definitely stated, and in this respect I am grateful again to my critic for pointing to a defect of my exposition. The analogy certainly does not 'hold good'[1] except in some general features, which perhaps might be styled 'external,' though this figure itself, as V. W. has so well reminded us, is very misleading. But if the critic maintains universally, "that you cannot alter the value of money by underlining it or printing it in capitals,"[2] I still venture to find some analogy to this in the *endorsement of bills*, which indeed heightens their value in that commercial circle where they have their 'currency'—though, to be sure, *hoc simile*, also *claudicat*. Perhaps it would be safer still to compare underlining to a special *warrant* of one who pays money, that his coins are genuine or that they are full weight; this will not enhance their value absolutely, but (possibly) it will to the person who accepts them.

I ask pardon if I do not think the objection stringent, that the 'metaphor' cannot be reconciled with other ones, which the critic deems to be 'truer'.[3] I should not describe metaphors as more or less 'true,' but as more or less illustrative and thereby useful. Furthermore, an analogy does not mean the same as a metaphor. The critic himself distinguishes what I may be allowed to explain by an example. If I say this word has lost its currency, I evidently employ a metaphor, implying as little real analogy[4] as if I speak of the stream of life, or of the tooth of time. A real analogy means, if I am not mistaken, that there is more than one *point of likeness*, that there is a likeness in the *relation* of several characters to each other, as in a "proportion" of mathematicians. And this I venture to uphold, there does

[1] P. 195. [2] *Ibid.* [3] *Ibid.*
[4] "Really analogous," p. 196.

exist between words as signs of sense and coins or other signs of value-in-exchange.

A danger certainly is annexed to all analogies as well as to metaphors, if they are not properly understood (metaphors of course are more easily understood). But the critic clearly shows that he has understood excellently well, by the concluding sentences.[1] And I may add, that "philosophy or science or indeed any serious writing"[2] can hardly be intended to convince or instruct ordinary readers,[3] who, as a rule, so thoroughly despise all this sort of "learned cant," and who indeed, as Plato warned pupils untrained in geometry, avoid "my humble roof". For, as the same Plato (in the Republic) so well says, no science or doctrine is able to inculcate itself into minds that are not seriously *willing* to receive, that is first of all, to understand it. And is not this *motto* the very *core* of what my generous critic himself is aiming at?

With respect to part ii., I am discovering many valuable suggestions in the 'Notes,' tending to develop my own views upon the subjects of the "evil and its remedy," which I had only hesitatingly put forth.

In particular, I am grateful to the critic for averting to the "too common confusion between separation and distinction".[4] As to the term "real"[5] there certainly will be no objection against reserving it for the 'physical' world, as soon as there is a universal agreement that the 'Real' is not the only 'Existent' or even 'Being'. Everything here would be settled, if only *authorities* were recognised and *laws* were kept.

Part iii. leads me to the concluding remarks, which only give me much pleasure by the free and full assent and appreciation my delineation of a remedy has found with so able a critic. I also agree that what I have styled an Academy, perhaps would be called more properly an "International Council of Reference," if this name were not too long.

A Council certainly it ought to be; it would have no coercive power; it would not work except by arguments and reasons. But the need of a universal language I consider to be imperative; this same need is very much felt at present by the existing national academies and learned societies, and it has been very remarkable to me, that only a year after I had written my essay (and before it was

[1] P. 196. [2] *Ibid.* [3] *Ibid.*
[4] P. 198. [5] P. 197.

printed) a Conference of those Academies should have taken place, with a view of settling the question of restoring Latin to its ancient position as the idiom of the Republic of the Learned. I do not share the fear "that its reintroduction might tend to create worse evils than even those which it was meant to cure";[1] for it would be more flexible than any living language and might very well *counteract* "the present tendency to use only archaic figures of speech";[2] and as to the danger signalised by the critic, that "it would fasten yet more firmly than at present the fetters of the formalist,"[3] why should not "the greatest vigilance be exercised" to meet the danger?

By the kind permission of the Editor, I venture briefly to acknowledge with gratitude the understanding sympathy with my aims, the too generous appreciation and the valuable criticism of my work, in the foregoing Note by Dr. Tönnies.

I may perhaps be allowed to add that I fully accept the explanation which he gives of the use of the 'money' analogy in describing certain aspects of language, and that I admit that I ought to have spoken of metaphor as valid or legitimate or apposite or relevant rather than as 'true'. Metaphor is of course the product of implicit analogy, which (though too often merely fanciful) claims to represent a true correspondence in character.

I ought also perhaps to say that while I have purposely confined my Notes to the view taken by Dr. Tönnies (as by M. Michel Bréal and others) of the remedy to be applied to the present confused state of philosophical terminology, my own view is that any effort made by this generation to raise the general linguistic level must fail, unless it takes the educative form.

V. W.

[1] P. 197. [2] *Ibid.* [3] *Ibid.*

IV.—SOME NEW OBSERVATONS IN SUPPORT OF THOMAS YOUNG'S THEORY OF LIGHT- AND COLOUR-VISION (II.).

By W. McDougall.

PART II.—COLOUR-VISION.

Section IV.—Discussion of Some *a priori* Objections to Young's Theory.

In the three preceding sections the way has been prepared for the consideration of Young's theory of colour-vision, firstly by the introduction of the conceptions of 'complete fading' and 'mutual inhibitions' of visual images, and secondly by the demonstration that the hypothesis of a special S-exciting process, which can find no place in that theory, is unnecessary and unfounded. Before describing any observations on colour I must consider here some objections to Young's theory of an *a priori* and general character. For I feel sure that to many persons these objections appear so weighty that unless something can be done to weaken the force of them they will not be able to consider the following sections without an adverse bias. These objections have been summed up by Prof. Cattell[1] in the dictum that Young's theory is 'pre-evolutionary' and 'pre-psychological'.

It is possible that these scientific-sounding epithets, pronounced in the tone of one who utters an oration over the grave of an unrepentant sinner, may seem to some minds to dispose finally of the theory in question. The characterisation of the theory as, 'pre-evolutionary,' is intended, I suppose, to express the opinion that it is not easy to picture the phylogenesis of the light- and colour-sense in terms of the theory. I believe that on the contrary it is possible to suggest a far more satisfactory view of the phylogenesis of the colour-sense in terms of Young's theory than in terms of Hering's, a view so much in harmony with all the relevant

[1] *Psychol. Rev.*, vol. i.

facts that the consideration of the problem becomes a support rather than a weakness to the theory.

Before presenting this view it is necessary to bring to the notice of those who have not specially concerned themselves with these matters of late years the present state of our knowledge with regard to vision under dim illumination. When Hering,[1] ten years ago, showed that at a sufficiently low intensity the solar spectrum appears colourless, as a mere band of grey of different degrees of brightness in different parts, this fact, taken in conjunction with the fact of the occasional occurrence of monochromatic or achromatic vision, seemed to give very strong support to his theory, because it seemed to prove that in the normal eye there is a special W-exciting apparatus which alone is functional in the monochromatic eye. There can now be no doubt about the existence of this separate W-exciting apparatus in the normal eye, and in the first section of this paper a new method of demonstrating its existence was discovered (obs. iv.).

But since Hering discovered the peculiar monotonous character of the low intensity spectrum and its similarity to that seen by the monochromatic eye, it has been shown, by experiments in colour-mixing, that the W sensation of the monochromatic eye cannot be regarded as produced by the physiological processes that determine the ordinary W sensation of the normal eye.[2] It has also been pointed out that the distribution of brightness in these spectra is very different to that in the spectrum of W light as seen by the normal eye.[3] Prof. Ebbinghaus[4] has proved also that the brightness of a W light formed by mixture of two complementary coloured lights cannot be wholly attributed to an independent W process.

Still more recently Herr. v. Kries[5] has brought together evidence that makes it appear in the highest degree probable that the rods are the retinal elements of an independent W apparatus which functions alone in the normal eye when affected by light of low intensity only, and in the monochromatic eye. This view of the function of the rods had been suggested thirty years before to Max Schultze by his studies in comparative histology. This hypothesis of the independent W-exciting function of the rods must then be taken up into and incorporated with Young's theory, and

[1] Pflüger's *Archiven*, Bd. 49.
[2] König u. Dieterici, *Zeitsch. f. P. u. P. d. S.*, Bd. iv., S. 327.
[3] See Ebbinghaus, *Zeitsch. f. P. u. P. d. S.*, Bd. v.
[4] *Ibid.* [5] *Zeitsch. f. P. u. P. d. S.*, Bd. ix.

when this is done the difficulty in representing the development of the visual processes in terms of this theory at once falls away.

It will be generally admitted that if we try to form a conception of the course of development of the colour-processes we must begin by assuming the vision of the lower animals, in which vision is but little developed, to be monochromatic, *i.e.*, we must assume the visual sensations to be of one kind only, varying only in intensity or brightness; and we must suppose this one kind of light sensation to be similar to our W or grey sensation or at least to stand to it in the relation of a direct ancestor. If we then seek the probable first step in the development of the colour-processes from this stage of simple grey-vision, we must, I think, assume that it consisted in a differentiation of the effects of the light of the warm and cold ends of the spectrum; the rays of the cold end would begin to set free, in addition to a W-exciting substance, a substance that by the excitement of a concurrently differentiated retino-cerebral apparatus would add the sensation of B to that of W; and in just the same way the rays of the warm end would begin to set free an additional X-substance that by the excitement of a second concurrently differentiated retino-cerebral apparatus would add the sensation of Y to that of W. If we then consider the state of a species in which the visual apparatus has achieved this degree of development we shall see that it would obviously be an advantageous arrangement that, when the retina was stimulated by W light, *i.e.*, by light containing rays of all wave-lengths, the two new colour-systems,[1] the Y and the B, both being excited in addition to the W system, should have the sensation-elements determined by them fused in consciousness to W. This compound W sensation-element would then add itself to and so re-enforce the sensation of W due to the excitement of the older W apparatus. For suppose that the Y and B sensations neutralised each other when the Y and B systems were excited together, this would leave a sensation of W but would involve a waste of the energy that, under the other arrangement, would go to re-enforce the W sensation. Or suppose the third possibility, namely, that Y and B when excited together fused to give a

[1] I use the word 'system' here and elsewhere in this paper, as also the word 'colour-system,' as a synonym for the phrase 'retino-cerebral apparatus' (or physiological mechanism). The word 'colour-system' as here used has therefore a meaning quite unconnected with the German phrase 'Farben-system,' and is only used because of the awkwardness of using 'apparatus' in the plural.

new kind of sensation. Then stimulation by mixed light would result in a sensation compounded of W and this new Y-B sensation; the ancient and primitive sensation of pure W or grey would have been lost, it could never again be experienced, and in place of the three perfectly distinct kinds of sensation Y and B and W yielded by the first arrangement, there would be possible only two, Y and B, and a mixture, bluish-yellow. To illustrate this by an example—it is obvious that a species or a variety endowed with the sensations of R and B and W would in this respect have an advantage over one endowed with R and B and P only.

Further, it is obvious that the original W apparatus would not be likely to undergo much further development if the Y and B systems developed in importance and in the intensity of the impression produced by them in consciousness, for they would yield when excited together a W sensation of correspondingly developed intensity.

It seems not unnatural to suppose that the developing differentiation of the colour-sensibility of the retina should have proceeded outwards from the centre, the region of acutest vision, and the one that is most used. In the peripheral zone of the human retina we have then the perpetuation of the primitive monochromatic stage of development of the eye, while the very rarely occurring monochromatic eyes are cases of reversion to, or arrested development in, this remote ancestral condition. In the same way the zone of the human retina, stimulation of which causes the sensations of Y and B and W only, remains in that stage of development in which only the first step of differentiation has been affected and the frequent cases of bichromatic vision, in which Y and B and W seem to be the only sensations that can be aroused by stimulation of the retina, are cases of reversion to or arrested development in this more recent ancestral condition.

If we try to picture the further evolution of the colour-sense, the process that would seem to be likely to give the best results, and therefore the one most likely to be effected by the factors that have controlled the origin and development of species, is a repetition of the process of differentiation such as gave rise to the B and Y systems, but occurring within either the B or the Y system. For reasons which we can hardly hope to determine this differentiation has proceeded in the Y system. The light of the two ends of the warm half of the spectrum must be supposed to have begun to set free, within the retinal elements of the Y apparatus, two different X-substances in addition to the Y X-substance, and with these two new X-substances, the R and the G, we must

assume the concurrent differentiation of the R and G retino-cerebral systems. Then just as it was obviously advantageous that Y and B sensation-elements, when excited together, should fuse to give W so obviously it would have been advantageous that R and G sensations when excited together should fuse to Y, else the primitive W and the original Y sensation would again be lost. As these two new colour-systems became developed in the retina from the fovea centralis outwards, the primitive Y apparatus would lose its importance and would probably undergo atrophy in this central region of most highly developed colour sensibility, just as the primitive W apparatus has become lost in the very centre, the fovea centralis itself. That the primitive W apparatus remains functional throughout the rest of those parts of the retina in which the colour-systems are developed is probably due to its having assumed the special function of vision under dim illumination, while no analogous functioning has justified the continued existence of the primitive Y system in the area of R and G sensibility.

This hypothetical sketch of the evolution of the colour-sense is such as is naturally suggested by the facts, and in the light of it it is not permissible to apply the epithet 'pre-evolutionary' to Young's theory, when that theory is supplemented by the theory of the separate W apparatus having its retinal endings in the rods. This view of the development brings Young's theory into harmony with the facts of colour-blindness and opens a road through what was perhaps the greatest obstacle in the way of its acceptance, namely, the fact that the dichromatic eye seems to see B and Y and W only.

The epithet 'pre-psychological' is meant, I suppose, to sum up the objections to Young's theory having their ground in the fact that W and Y cannot be analysed by introspection into a number of different colours, but appear to be simple sensations. In the case of W this seeming simplicity is an indisputable fact, but we have no particle of ground for accepting this fact as proof of the singleness of the underlying pyscho-physical process.[1] If we put aside a vague feeling of the fitness of things, and the demands of this or that theory entertained by us, we have only analogy to help

[1] I use this term in the sense in which it is used by Prof. G. E. Müller, namely, to denote that part of the total physiological process which is the immediate correlate or determinant of consciousness and which, as I have argued in a previous paper (MIND, vol. vii.), probably consists in the passage of the impulse across the synapses from neuron to neuron in the highest levels of the cerebral cortex.

us in forming an opinion; and all analogy is against the supposition that a compound sensation, one resulting from the fusion of two psychical events having separate but contemporaneous underlying psycho-physical processes, must always be analysable, must always reveal its complex character to the reflecting mind. How many ears cannot analyse a clang into its component notes, or in fact distinguish a clang from a simple note! How many persons cannot differentiate the taste from the odour in the flavour of a familiar article of food! If the above rough sketch of the development of the colour-sense be approximately correct then it has been advantageous to species that the colour-processes, when excited all together and in equal degree, should by psychical fusion determine a sensation of W and that the R and G processes should in the same way yield Y, and it is surely absurd to suppose that Nature is incapable of bringing about such a result, merely because it is repugnant to our vague sense of the fitness of things. To do this is to invoke the aid of the historic anti-scientific principle that has perhaps done more than anything else to hinder the progress of science, and the influence of which, as the history of 'psychical research' shows, seems to have grown stronger with the advance of science, the principle, namely, that what we cannot understand cannot be true.

In the light of the above scheme of development it seems probable that the sensations of W and Y, although usually compound, give the impression of simplicity because they were originally evolved as simple sensations. I would further point out that if we accept as valid the inference from the feeling of simplicity to the simplicity of the underlying psycho-physical process then Hering's theory is in an equally difficult position with Young's theory. For we must then accept the same sort of feeling as our guide in determining which are the pure colours of the spectrum. If then we choose a pure R and a pure G light according to the dictum of consciousness, they cannot be made to yield by mixture a grey or W, but, as I shall show below (observation xlvii.), only various tones of R, Y and G.

Now Hering's theory demands that the light which excites the sensation of R only (in addition of course to W) and that which excites the sensation of G only, shall be complementary to one another; but of a complementary pair of R and G lights, one or other, the R or the G (or both), is always, according to the dictum of consciousness, a mixed or compound colour. Hering's theory is therefore equally 'pre-psychological' with Young's, and even more so, for to my

mind it is easier to believe that a sensation of W may be excited by three concurrent psycho-physical processes than that a sensation, clearly containing both R and B elements, or G and B elements, may be excited by one simple psycho-physical process.

Section V.—Monocular Struggle, or the Mutual Inhibitions of Images Excited by Simultaneous Stimulation of Coinciding Retinal Areas of Two or More Colour-Systems.

The phenomenon of binocular struggle of different colours is familiar, and it is now pretty well agreed that when corresponding areas of the two retinæ are stimulated at the same time by lights of different wave-length, the colour-images may either appear alternately in consciousness, each in turn pure and unmixed with the other, or they may fuse to give the colour or neutral tone that usually results from their presentation to an area of one retina as an objective mixture.[1] Intensity of the coloured lights favours mutual exclusion, and dulness of the lights favours fusion in consciousness. The fact of fusion is obvious to most observers and is generally admitted, in spite of the curious passages in Helmholtz's *Physiologische Optik* (§ 777), in which the author while denying that binocular mixture of R and B can give sensation of P, yet admits that he may see the R and the B simultaneously at the same place. If now we consider the case of binocular struggle and fusion of R and B it is obvious that, whether we hold by Young's theory or by Hering's, we have to regard the struggle as due to the tendency to mutual inhibition of the cortical processes in corresponding areas of a R apparatus and a B apparatus; while fusion to form P we have to regard as a purely psychical fusion. By psychical fusion of R and B I mean that in a cortical area of one colour-apparatus there is going on a psycho-physical process which, when it occurs alone, determines a sensation of R, and in the corresponding cortical area of the other colour-apparatus is going on a psycho-physical process which, when it occurs alone, determines a sensation of B, but the two processes proceeding simultaneously each determines its proper sensation-element, which two elements fusing, by a purely psychical act, become the sensation of P. Of two colour-systems then, excited at the same time but separately in the two retinæ, each may assert

[1] See Rivers, *Proc. Camb. Phil Soc.*, vol. viii., part v.

itself alone in consciousness, alternately with the other, or the two may affect consciousness at the same time and by psychical fusion give rise to a mixed or compound sensation.

Whether we hold by Young's theory or by Hering's we have to assume a separate retino-cerebral apparatus or system for each of the primary or simple colour-affections, R, G, B and W systems in the former case, R, Y, G, B, W and S in the latter case. We must further believe that each retina contains the peripheral endings of the nerve-fibres of its own set of four colour-systems that are distinct from the four systems of the other retina (or, according to Hering's theory, the six systems); for although it has been suggested that the central connexions of corresponding points of the two retinæ are anatomically identical this view is untenable. The view is naturally suggested by the fact that the fibres from corresponding halves of the two retinæ go to the same cerebral hemisphere. But this seems to be a false lead and is probably to be regarded as an arrangement of anatomical convenience merely, brought about in order that the centres for the left halves of both retinæ (*i.e.*, for the right halves of the objective visual fields) may be in convenient proximity to the centres governing the movements of the right hand. Helmholtz[1] rejects the suggestion of the identity of the centres chiefly from a consideration of the influence of voluntary attention in effecting the predominance of one or other of two struggling fields, and his arguments and conclusion seem to be irrefutable.

But the following observation affords additional evidence in the same sense.

Observation XXV.—I fixated a bright W light (the window against a bright sky) for thirty seconds with the right eye only, and then covered both eyes carefully with several folds of black velvet. The vivid after-image faded completely after five minutes. I then admitted diffused daylight to the closed lid of the left eye for about two seconds, taking great care to admit none to the lid of the right eye. The after-image revived at once and died away again after about five seconds. It reappeared in this way at every repetition of the admission of light to the closed left eye during the following ninety seconds, and after that time could not be thus revived, even by admission of strong light to the left eye. I then admitted feeble light to the lid of the right eye for one or two seconds, when the after-image at once reappeared and persisted, after covering the eye again, for about five to ten seconds. It

[1] *Phys. Optik*, § 771.

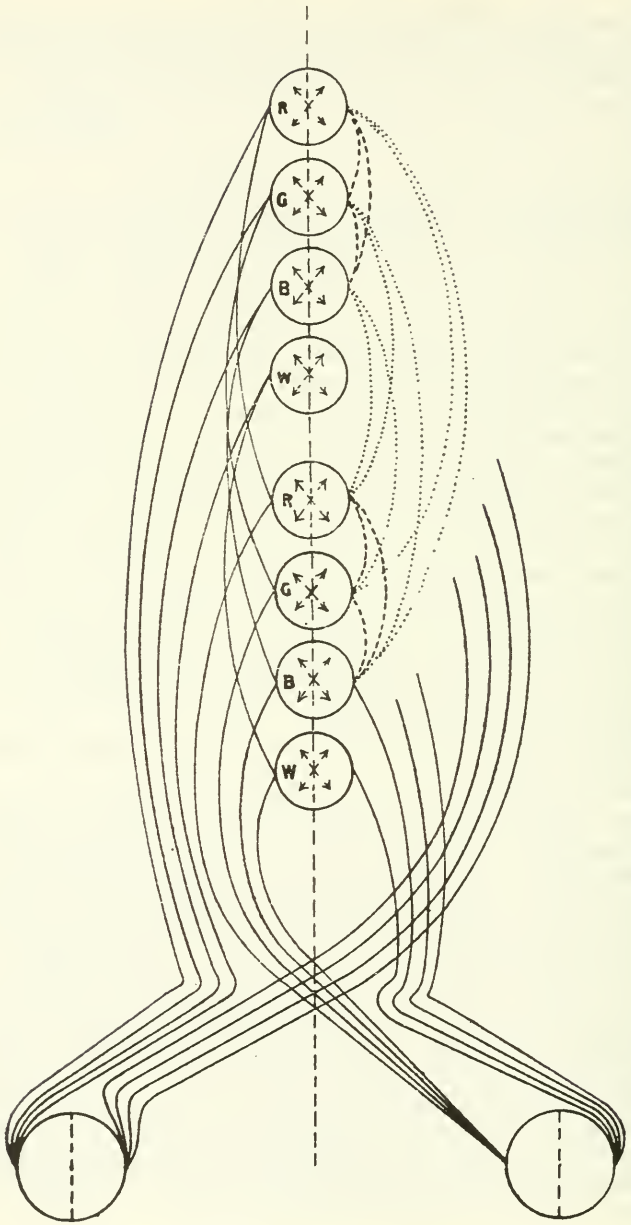

FIG. 15.—(For description see next page.)

could be revived in this way during the following four minutes.

This observation, which I have repeated many times, seems to afford additional proof of the separateness of the cortical areas of the two eyes. For I have shown in section i. that the complete fading of after-images, while they are still revivable, is due to a failure of the nervous impulses excited in the retina to propagate themselves through the cortical areas in which consciousness is immediately determined. The effect of momentary stimulation of the retina by dim equally diffused light, in bringing back to consciousness after-images that have completely faded, can only be due to its raising the excitability of the visual cortical area, so that the feeble impulses coming from the retina are enabled to pass once more through these highest levels. Now, if the cortical areas of the two retinæ were identical, when the after-image is formed on one retina only, the admission of dim light to either eye should be equally effective in reviving the faded after-image. But we find that, though it has a perceptible effect of this sort in both cases, that effect is very much slighter in degree, and ceases to be effective much more rapidly in the case of the eye in which there is no after-image. The slight effect of stimulating this eye shows that there is some close and sympathetic connexion between the cortical areas of the two retinæ, although they are not identical.

The separateness of the retino-cerebral system of neurons connected with either eye may be inferred with a high degree of probability from phylogenetic considerations. Man and some of the quadrumana are the only vertebrates whose right and left visual fields overlap to any considerable extent. Their ancestors have had a pair of eyes which were incapable of being simultaneously affected by light from the same

Fig 15.—Diagram representing the two retinæ and the cortical centres connected with them. The upper four circles represent the cortical levels of the R, G, B and W systems connected with the left retina, the lower four the cortical levels of the R, G, B and W systems connected with the right retina. The broken line bisecting all the circles represents the purely anatomical separation of each centre into two halves which lie in opposite hemispheres of the brain. The continuous lines on the left side represent the sympathetic relation between corresponding points of the two systems of similar function connected with the right and left retinæ respectively. The dotted lines represent the antagonism between any point of any one colour-system of the one eye and the corresponding points of the other two colour-systems of the other eye. The broken lines represent the feebler antagonism between any point of any one colour-system of one eye and the corresponding points of the other two colour-systems of the same eye. The arrows radiating from the centre of each circle represent the antagonism between any point of the cortical level of any one of the systems and every other point of the same.

object. Either eye was therefore a separate organ complete in itself and incapable of being directly affected by the excitement of the other eye; and our eyes are the descendants of such a pair of separate and complete organs. And Dr. Gaskell has shown how in the course of evolution all other parts and organs may change and disappear like the baseless fabric of a dream while the central nervous system stands fast.

We may then represent the retino-cerebral systems demanded by Young's theory diagrammatically as in figure 15. For each of the four primary or simple visual sensations there are two complete retino-cerebral systems, one for each eye. Although the cortical area of each of these systems consists anatomically of two halves lying in opposite hemispheres, yet it seems to be functionally one and indivisible; this purely anatomical division of the cortical areas I have represented in the diagram by the vertical broken line bisecting each one. To represent the sympathetic relation between points of the cortical area of each system of one eye and the corresponding points of the system of similar function of the other eye I have drawn the continuous lines. Whether these lines represent actual nerve-fibres, *i.e.*, whether the sympathetic activity is brought about through the medium of nervous impulses, or whether it is purely psychically determined, we have, I think, no means of deciding. For the latter possibility we have now an analogy, perhaps a somewhat distant one, in the Marconi system of telegraphy.

Again, the cortical area of each colour-system of one eye must be represented as so related to the cortical area of each of the other two colour-systems of the other eye, corresponding point to corresponding point, that activity of the one tends to inhibit activity of these other two, although it does not necessarily and always do so. This relation is represented by the dotted lines in the figure. Now when the simultaneous excitement of two of these systems results in binocular colour-mixture, this is due to psychical fusion, and the interesting question arises, as in the preceding case—When inhibition of the activity of the one by that of the other occurs, as in binocular struggle, is this also primarily an inhibition of one psychical event by the other, with perhaps a consequent inhibition of the underlying psycho-physical process, or is the inhibition effected through the medium of nerve-fibres, the psycho-physical process being primarily, the psychical only secondarily, inhibited? The latter view seems to be more in harmony with the facts described in sections i. and ii. But it is perhaps not possible to decide

in favour of either, and to do so is not a matter of vital importance to the present discussion. The essential fact is the tendency to mutual inhibition.

Those who accept Hering's theory[1] must represent the retino-cerebral systems by a similar scheme with the difference that they must assume six instead of four colour-systems for each eye, and with the complication that the six systems fall into three pairs. They must assume each pair to be marked by the peculiarity that its two systems can never be simultaneously excited by external stimuli, because the retinal processes, which are the specific stimuli to the two systems, are mutually exclusive in character. Thus they must assume that the corresponding parts of the G and R systems of one eye can never be excited simultaneously, because the retinal processes excited by R light are antagonised by the action of G light, and where R and G light of equivalent intensities fall together upon an area of one retina, *i.e.* upon coinciding retinal areas of the R and G systems, neither of them is excited, but only the W system.

But now a difficulty presents itself for the theory of 'Gegenfarben'—What happens when R light falls on part of one retina and G light upon a corresponding part of the

[1] In dealing with this point I find it impossible to criticise the theory of 'Gegenfarben' as put forward by Hering himself, because I cannot discover that he has assumed any definite or consistent attitude towards the problem of the central connexions. The criticism of this paragraph applies therefore to Müller's improved and logical form of the theory. In the paper 'Zur Erklärung der Farben-blindheit' etc. (*Lotos.*, Bd. i.) Hering writes (p. 4) that he assumes six distinct psycho-physical processes, corresponding to the six primary sensations and that all these always proceed simultaneously but with different intensities in what he calls the 'Seh-substanz'; that a R light can increase the intensity of the R, Y and B psycho-physical processes but never that of the G. If we may infer from this that Hering regards the assimilation and dissimilation of the R-G retinal substance as incapable of proceeding simultaneously in the same area, then his theory is in this respect essentially similar to Müller's, and the criticism of this page applies equally to both. But if the dissimilation and assimilation of the R-G substance be assumed to proceed side by side, an assumption to which there can be no *a priori* objection, and which seems to be made by Hering in other connexions, where is the mutually destructive action of the effects of R and G light, resulting in neutralisation, to be conceived as occurring? Hering tells us it is not in the 'Seh-substanz,' but that there the R and G psycho-physical processes may and perpetually do take place simultaneously. If it be suggested that the antagonism is between the R and G psychical processes, this can only be accepted in the sense of Young's theory, in the sense namely that the R and G psychical processes destroy each the specific character of the other and so result in a third kind of sensation, Y or W. For it is impossible that the two psychical processes should abolish each other; that would be to equal the feat of the two Kilkenny cats that devoured each other so that none was left.

other? There can be no mutual exclusion of the two retinal processes, the R system is excited in one eye and the G system in the other. How then is the resulting sensation of W or grey to be accounted for in terms of this theory? So far as I know Hering has not dealt with this difficulty further than by refusing to assign definitely his hypothetical assimilation and dissimilation processes to the retina. It will be generally admitted that if Hering, in order to meet this difficulty, locates the assimilation and dissimilation processes elsewhere than in the retina, his theory loses at once its attractive plausibility. Müller[1] attempts to meet the difficulty by the dictum that if the two retinal processes concerned are incompatible with one another then the nervous impulses set up by them, when separately at work, must also be incompatibles, so that in the case of binocular mixture of two complementary colours, *e.g.* of R and G, to give a W sensation the nervous impulses started in the two retinæ neutralise one another in the brain. This suggested escape from the difficulty seems to involve the assumption that the cortical centres, or some part of the cerebral paths of the fibres from the two retinæ are identical. But even if the evidence which refutes this view were lacking, the further assumption that, while nervous impulses exciting the sensations of R and B may proceed simultaneously in the brain, those exciting R and G cannot thus proceed, because the chemical processes by which they are initiated are opposed in character, this further assumption is one that has but slight foundation; for Müller's extremely complex argument in 'proof' of this assumption[2] involves the further assumption of an intimate knowledge of the physics of the nervous impulse and the acceptance as established facts of views that to most readers will seem to be merely interesting hypotheses.

We see then that for the explanation of binocular mixture of complementary colours giving sensation of W, while Young's theory requires only its one fundamental postulate of psychical fusion, Hering's theory requires two additional assumptions complicating the fundamental one of mutually opposed retinal processes; and of these two complicating assumptions the one, that of the identity of cerebral paths, is rendered untenable by the considerations adduced by Helmholtz and by the facts described above in observation xxv., while the other has no foundation, but is purely hypothetical and invented to meet the requirements of the case.

[1] *Zeitsch. f. P. u. P. d. S.*, Bd. xiv., § 32. [2] *Ibid.*, § 30.

An alternative open to the holders of the theory of 'Gegenfarben' is to assume that there are only three retino-cerebral systems connected with either retina, and that a pair of complementary sensations are excited by two different kinds of activity throughout the same system. A third possible view is that the nerve fibres connected with either retina, together with their central prolongations (*i.e.*, the central neurons), are of one sort only, but that each is capable of being excited throughout its length to six different kinds of activity, corresponding to the W, S, Y, B, R and G sensations respectively. But these difficult assumptions would not render easier the explanation of the W sensation resulting from binocular mixture of colours in face of the fact that we must assume separate central paths for the two retinæ.[1]

Returning now to the consideration of our scheme of colour systems the following question presents itself—How is it that, while simultaneous excitement of corresponding areas of the B system of one eye and the R system of the other may result, according to the conditions, in fusion of the sensations to P or to alternate exclusion of one by the other, in the case of simultaneous excitement of corresponding areas of the R and B systems of one eye fusion of the sensations to P seems to occur in every case?

In considering this question it is well to bear in mind the fact, so forcibly insisted upon by Lotze, that what needs explanation is not the fact of fusion in consciousness of the effects of simultaneous visual stimuli, but the absence of fusion in any case, as in all cases in which they do not fall upon the same or corresponding points. When R and B lights affect the same area of one retina their effects fuse in consciousness not because they have the same 'local sign' but because they are not held apart through having different 'local signs'. In the case of R and B lights falling upon the same area of one retina, the 'local signs' of the two affections of consciousness are presumably identical, but in the case of R and B lights falling on corresponding areas of the right and left retinæ respectively the 'local signs' cannot be identical and as Lotze pointed out,[2] not even quite similar, owing to the necessity for convergence of the eyes in vision

[1] Müller argues in favour of the assumption of three separate kinds of material substratum for the psycho-physical processes, one for each of the pairs W and S, Y and B, G and R; but he inclines to the view that each retinal element is connected with one fibre of the optic nerve only, and is the seat of the six different chemical changes that initiate six different kinds of impulse in the nerve fibre (§§ 28, 29, 30).

[2] *Medicin. Psychol.*, § 30.

of near objects. This would seem to account sufficiently for the fact, insisted upon by Helmholtz, that the result in consciousness of binocular mixture of R and B differs appreciably from the result of their monocular mixture, in that in the former case the fusion is less complete and attention may more easily be directed to one or other and cause it to predominate in consciousness.

Another factor is probably of greater importance in determining the less tendency to fusion of binocularly than of monocularly mixed colours, namely the effects of use.

It is obvious that in the ordinary course of life the simultaneous excitement of corresponding areas of the R system of one eye and the B system of the other must be of extremely rare occurrence, while the simultaneous excitement of the R and B systems of one eye is of frequent occurrence, namely, whenever we see a P object. It seems therefore probable that the difference in the result of simultaneous stimulation of two colour-systems in the same and in opposite eyes is largely due to the effects of use, and since there exists antagonism and a tendency to mutual exclusion of the activities excited in corresponding cortical areas of two colour-systems of the right and left eye respectively, it must be held that a similar antagonism may exist between corresponding areas of the colour-systems of one eye and may be expected to manifest itself under suitable conditions.

Fechner[1] has pointed out this possibility and he states that Plateau and he himself have proved it to occur. But I cannot find any record of observations on the subject by either of these authors. Most other writers seem to have ignored the possibility. Helmholtz mentions merely that one colour may under suitable conditions appear to be seen through another in monocular vision.

In the paper by Mr. Breese[2] referred to in section i. the author describes perfectly clearly a case of monocular struggle, when patches of R and G light were thrown upon the same area of one retina, but he does not seem to have realised the great theoretical significance of his observation. His method of mixing the two colours was to fixate a square of R on a grey ground with one eye (the other being covered) and then to bring the vertical edge of a glass prism across the centre of the pupil so that the R rays enter by one half of the pupil only. A G square was then so disposed that rays from it entering the prism were

[1] *Abh. d. sächs. Ges. d. Wissensch*, 1861, Bd. v.

[2] "Monograph Supplement" to *Psych. Rev.*, May, 1899.

refracted and sent to the same area of the retina as the R rays, through the other half of the pupil. He then observed a distinct struggle with alternate predominance of R and G. It is to be noted that the two coloured fields were crossed by diagonal lines in opposite directions and also that Breese had been using these same two patches of R and G in a long series of observations in stereoscopy, and it seems possible that thereby a very definite physical disposition of the cortex had been built up for the apperception of each of the two patches and that these favoured the occurrence of struggle in his case. Nevertheless, on repeating the observation I was able to see the struggle of R and G perfectly clearly. It is noteworthy that, although under these conditions Y is the predominant colour of the combined patches, yet one has the impression of seeing the one colour through the other just as is often the case in binocular colour-mixture. Breese notes this fact, and it is interesting in connexion with Helmholtz's discussion of binocular colour-mixture. For Helmholtz advances this fact, that one colour seems to be seen through the other, as a proof that the binocular mixture does not occur, but that as he says one merely sees the two colours occupying the same area at the same time. It is obvious of course that it is not that the colours do not fuse to give a sensation of Y, but that the psychical factor, the knowledge that there are two objective patches of colour superposed, and also the lack of exact coincidence of the two patches, cause the appreciable difference between the Y so produced, whether by monocular or binocular mixture, and a simple patch of Y.

The conditions most favourable to the observation of monocular struggle may be expected to be (1) steady and prolonged fixation; (2) relaxation of the ocular muscles (for these conditions are conducive to complete fading); (3) fairly bright colours; (4) sharply bounded patches of simple and definite shape, different for the two colours; for, as was pointed out in section i., a homogeneous and definitely bounded patch of colour tends to come and go in consciousness as a unit, more or less independently of other parts of a complex image. I therefore repeated Breese's observation with certain modifications described below and found that in this way I secured more satisfactory results.

Observation XXVI.—I cut a vertical slit, 30 mm. by 15 mm., in a sheet of cardboard and, at a horizontal distance of 15 cm. from it, a second hole in the form of a cross of the same dimensions as the former. This I fitted into an aperture in the shutter of the dark room and covered the one hole with

R paper and the other with G; so that there appeared a bright R patch and a bright G cross on a dark ground. I then fixed a glass prism with edge vertical and at a few inches in front of the R patch and turned towards the G cross, and brought one eye as close as possible to this edge of the prism in such a position that this edge fell across the centre of the pupil. By a little management of the prism I could then throw the image of the G cross reflected from its anterior surface on to the same area of the retina as the image of the R patch so that I saw a R patch with a Y cross upon it, as in figure 16. Slight movements of the head from side to side then cause the R or G to predominate, and at a middle position of the head they fuse to Y. On fixating steadily with relaxed accommodation and a + glass before the eye to preserve the definition of the patches there occurred at moments complete fading of the R patch, leaving

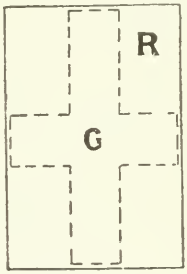

FIG. 16.

the cross a pure G, and at other moments the whole cross disappeared, leaving the R patch only; or some part, a vertical or horizontal limb, of the cross would disappear leaving the rest of the cross Y upon the R patch.

On using R and B in place of R and G both struggle and fusion to P occurred very readily.

A second method by which I have observed monocular struggle is the following:—

Observation XXVII.—In a large sheet of cardboard I cut two holes, each 30 mm. by 15 mm., the long axis of the one being vertical and of the other horizontal. Over one I pasted a sheet of R gelatine and over the other a sheet of G gelatine, and over both a sheet of white paper with closely set parallel black lines. On setting up the cardboard in a frame against a strong lamp the light comes through both paper and gelatine, and the holes appear as in figure 17, the one a bright R and the other a bright G, and both crossed by the

parallel lines diagonally. I then set a thin sheet of plane glass perpendicular to the cardboard along the line *a b*. On looking obliquely through the glass with one eye, the direct image of the one patch and the reflected image of the other could then be combined in the usual way, *i.e.*, thrown so as to fall across each other upon the retina. There then appears a short-armed cross of which the centre is a square area in which the retina is affected by the rays from both the R and the G patches. In this area the diagonal lines of the two images cross one another at right angles, those of the reflected image being reversed.

A rivalry of the two sets of lines in this area is then very obvious if the brightness of the R and G patches be made about equal. It resembles closely the rivalry of lines that occurs on combining binocularly the cross-lined squares of figure x., plate viii., in Helmholtz's *Physiologische Optik*.

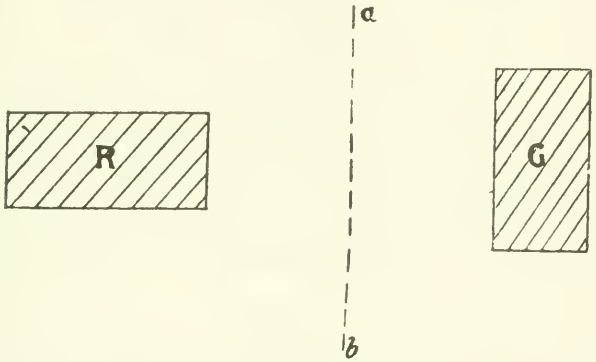

Fig. 17.

The lines of one or other set may be present alone at one moment, and then patches of lines of the other set may appear suddenly in parts of the area, or the one set may give way suddenly and completely to the other. The only difference between this rivalry and the binocular rivalry is that in this case the two sets of lines combine, *i.e.*, appear simultaneously in consciousness, more readily, whereas, as we have seen, this can only be effected to a slight extent, in the case of the binocularly combined lines, by a great effort of attention. When the lines of the R patch appear alone they are G and the spaces between them are R, and conversely with the lines of the G patch; but when both sets of lines are visible in one area the spaces between them are Y.

On repeating this observation, using daylight from the bright sky instead of lamplight, the spaces appear W when both sets of lines are visible; otherwise the phenomena are exactly similar to the above described. The rivalry is in this case so striking that a lay person, who knew nothing of the subject or of the purpose of the experiment, on looking at the combined image at once remarked upon the curious play of lines and colours.

But the cross lines, although they assist, are not essential for the production of rivalry of the colours, as is shown by the following observation.

Observation XXVIII.—I laid a strip of crimson paper, 30 mm. by 15 mm., vertically upon a sheet of black paper and below it a similar strip of G paper horizontally, as in figure 18.

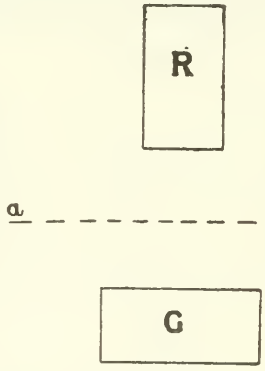

FIG. 18.

Then by means of a glass plate standing vertical to the paper along the line *a b* I combined the direct image of the one with the reflected image of the other coloured strip so that they formed a cross. Then on steadily fixating with relaxed accommodation and with a + glass before the eye to preserve definition there appeared a lively struggle or alternation of the images in consciousness. At times both the R and G images were complete and the common square centre appeared a bright grey, at times the R or G image disappeared entirely leaving the other one alone and pure. This too I have repeated with other pairs of colours.

A third method by which one may observe the struggle between colour-systems of one eye excited simultaneously in corresponding areas is simply to fixate steadily a patch of light of not too low intensity for a considerable period. Since

every kind of light (except light of low intensity) stimulates all three colour-systems as well as the W-system, and since the tendency to complete fading of any image excited by continued stimulation of any one of the systems becomes greater the longer the image has remained present to consciousness, it may be expected that on prolonged fixation of any light one or other of the colour components of the image may fade completely, leaving the others still in consciousness. Such a case is described above in section i. (observation iv). In that case the R component of a R light faded leaving the W component only as a pure sensation.

Observation XXIX.—For me the simplest variety of this method of observing monocular struggle, is to fixate steadily the window-pane against an evenly bright white sky, such as is common in this country in bright wintry weather. After a period of fixation of a few seconds, a period which varies inversely as the brightness of the sky, each pane becomes suddenly a very bright G of low saturation. The G rapidly turns to B and then, after perhaps thirty seconds, patches of dull purple begin to appear and the panes show for some seconds all the familiar appearances of rivalry of R and B, such as are seen when the sky is looked at with a R glass before one eye and a B one before the other. After about fifteen seconds the B yields to the R and pure bright R alone remains and persists for two or three minutes, becoming gradually duller and losing saturation until only a dull grey remains.

A similar sequence of colours I have observed many times, using also sunlight transmitted by plates of milk-glass and ground-glass, or reflected by sheets of W paper. It never fails to occur if only the W light be bright enough. The only variation is in the initial stage in which B is sometimes present mixed with G, or alone. Thus, if I fixate the brightly glowing mantle of a Welsbach incandescent gas-lamp, a W light tinged with Y, it becomes, after a few seconds, a bright B which may persist from thirty to sixty seconds and then as rapidly becomes a pure bright R.

Fechner[1] has described a somewhat similar sequence of colours on fixation of bright W light, but he described the first colour to appear as Y. This difference is easily explicable, as I shall show later. He suggests that the phenomenon is due to the different rates of advance of fatigue in the different colour systems. In this I agree with him, but I would assign the fatigue, that is here concerned, not to the

[1] *Pogg, Analen.*, Bd. l.

retina, as probably Fechner conceived it, but to the cortical levels of the different colour-systems.

Hering has described how, after fixating a bright patch of colour for some thirty seconds or more, and then diminishing its intensity, as by casting a shadow upon a fixated patch of coloured paper, or turning down the lamp which illuminates it, the original colour disappears and gives place to its complementary colour. When the fixation is further continued the complementary colour slowly loses saturation, until it passes back through a neutral tone to the original colour. Hering claims that all this can be accounted for in terms of his theory. However that may be, I have to describe a phenomenon similar to this but more striking and not easily to be reconciled with Hering's theory. The observation consists in the application of the method of simple prolonged fixation to patches of coloured light of good saturation and medium brightness.

Observation XXX.—I laid a strip of R paper on a ground of medium grey in the full light of a strong reading-lamp and at a distance of 12 inches fixated with one eye, the other being covered, a spot on a square of W paper 2 mm. in width, laid on the centre of the R paper. I maintained full accommodation by a voluntary effort in spite of a tendency to relaxation that soon made itself felt. For about two minutes the R simply grew less saturated and then a veil of pale G seemed to shoot suddenly across the R, which seemed to remain visible through it, and then to retire as suddenly after about two seconds. This occurred several times in rapid succession, and then, after two minutes from the first appearance of this G veil, the R suddenly disappeared entirely and was replaced by a rich B-G, quite as saturated and vivid as the R itself when first fixated. The B-G persisted for about two seconds and then suddenly gave place to the pure R of undiminished saturation and brightness. This alternation of R and B-G occurred several times at short intervals. Then, while still fixating steadily, I relaxed my accommodation, whereupon the whole field of view faded completely, except the W square, which remained very dimly visible. Then this too faded completely and I experienced the sense of absolute darkness or blackness mentioned in observation iii. which I hold to be due to the condition of complete inactivity of the visual cortex, as distinct from the condition in which the 'Eigenlicht' is at work while there is no stimulation from outside. This absolute blackness endured only about two seconds and then the W square slowly emerged from the darkness into consciousness, followed by the R strip

and then by the rest of the field. This complete fading of the whole field recurred several times while I allowed my accommodation to remain relaxed. Then, by a voluntary effort, I restored full accommodation once more, when the complete fading ceased to occur and the alternation of R and B-G set in again and continued as long as I continued to fixate, the R predominating in the length of its periods, though the B-G was not inferior to it in vividness and saturation.

This observation I have repeated many times with slight variations of the conditions. Its novelty and theoretical importance will perhaps justify the description of a similar fixation, the results of which differed instructively from those described above.

Observation XXXI.—I laid a disc of R paper on a grey ground in strong lamplight. The R inclined a little to the orange side of pure R. I fixated as before with full accommodation. After two and a half minutes the first marked change of colour occurred, the R passed rapidly through Y to a pure bright G, the transition lasting only about one second or less. After two to three seconds the G gave place again to R. These changes from R to G continued to occur at intervals of ten to thirty seconds throughout the next twenty minutes. In the stage of transition a yellow phase was usually though not always perceptible. After twenty minutes there was perceptible some B mixed with the G and sometimes there was a glimpse of pure B, and then during a further period of fixation of about twenty minutes there occurred frequent changes of R to B-G, and usually there was perceptible a momentary grey phase during the transition.

The shortest period of fixation, after which I have observed this reversal of colour on simple fixation, was eighty seconds. For a long time I failed to observe any such change, save while accommodation was maintained, but I have once seen it during relaxation of accommodation. I have seen it equally well when using both eyes and in bright daylight as well as in lamplight.

I have observed similar changes to the complementary or approximately complementary colours on simple fixation of patches of B, G and P, although in my case it occurs most readily, I think, with R. A striking way to make the observation is to place a R and a G strip side by side with only a narrow band of grey ground between them. Under such conditions I have seen the R strip become G, and at the same time the G strip become a reddish purple, so

that the two strips almost seemed to have exchanged places.

One interesting feature that sometimes occurs I have yet to describe. During fixation of a R strip the B-G sometimes shoots across it without entirely covering the strip, for the R is still visible in tiny spots, so that it appears to be seen through numerous minute holes in a B-G cover. This resembles closely the phenomenon of 'Glanz' sometimes observed during binocular colour-mixture.

Sometimes at the moment of reversal of the colour, I am conscious of a slight sense of muscular activity about the eyes, and it is possible that slight contractions of the pupil are the occasions of the reversal in many cases. For if the fixation be made with partially relaxed accommodation the reversal can then be brought about at will by increasing the degree of accommodation, and at the same time, of course, narrowing the pupil and so cutting off from the retina some of the rays from the coloured strip. But frequently I cannot detect any change of accommodation or sense of activity of the eye-muscles at the moment of reversal, and a change in the pupil can only be an assistant cause of the change of colour in any case.

The full explanation of this phenomenon of reversal of colour during prolonged fixation I must defer until after treating of after-images of coloured light. Here I will only point out that it is clearly a case of struggle between the different colour-systems of the one eye, simultaneously excited in coinciding areas of their retinal levels.

In the case of a compound colour such as P it is obvious that two kinds of struggle are theoretically possible on fixation, firstly, a struggle between the R and B, the R and B systems being equally stimulated by the P light, and secondly, a struggle between P and its complementary G. This latter kind of struggle occurs when a simple patch of P light, as a strip of P paper, is fixated for some minutes with accommodation maintained. The other kind of struggle, that between R and B, I have been able to observe only when accommodation is relaxed, and the R and B areas do not exactly coincide. The following observation illustrates the influence of the lack of coincidence of the retinal areas stimulated in the R and B systems.

Observation XXXII.—I cut a hole 15 mm. by 10 mm. in a piece of cardboard and fixed the carboard over an aperture in the window-shutter of the dark room, and covered the hole with a piece of the P paper supplied by Rothe for the colour-wheel. On fixating this bright P patch, with accommodation main-

tained, struggle occurred between P and G, and with relaxed accommodation I could not observe any change of colour. I then fixed a glass prism vertically before the shutter in such a position that on looking into it I could see the P patch refracted through the prism. The patch then appeared as two overlapping patches of coloured light, the one R the other B, and P where they overlapped, as in figure 19. Each was fairly sharply bounded, for apparently rays of two wavelengths only are transmitted in any quantity by this paper. I fixated with one eye with relaxed accommodation and a + glass before the eye to preserve the definition of the images. There occurred then just such a struggle of R and B as results when R and B patches are made to overlap binocularly by fixation of two separate patches of R and B with both eyes and parallel visual axes. Sometimes the R faded completely leaving the B alone, sometimes the B leaving the R alone, sometimes the lateral strip of pure R or B faded leaving the

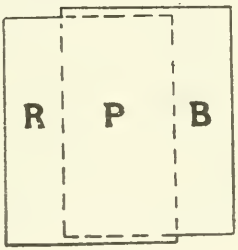

FIG. 19.

rest of the figure, and sometimes both lateral strips leaving only the middle strip of P.

The influence, favouring the struggle of R and B, of the lack of coincidence of the stimulated retinal areas of the R and B systems seems especially interesting. It is due largely, or perhaps wholly, to that tendency to cohesion of parts of a homogeneously stimulated area of any colour system which was illustrated by observation xv. We have here a factor of which it is impossible to say that it is physiological or psychical, or rather we seem to get a glimpse of the physiological mechanism underlying what may be properly accounted a psychical factor.

We seem to have in this method of prolonged fixation a means of distinguishing between the physiologically simple and the compound colours, namely by observing whether they are capable of analysis into two constituent colours or only capable of reversal to the complementary colour. It is

interesting then to apply this test to Y, which is claimed by Hering as a simple colour. Under this test Y behaves as a compound colour, showing a struggle of R and G.

Observation XXXIII.—If I fixate any patch of bright Y light, a square of ground-glass covered with Y gelatine and held up against the sun, or the flame of a lamp seen through a sheet of Y gelatine, it becomes after some seconds, and the more rapidly the brighter the light, a pure bright R, which persists a few seconds only and then passes back rapidly through Y to become a pure bright G which seems to persist indefinitely.

Y does not readily become B under the conditions under

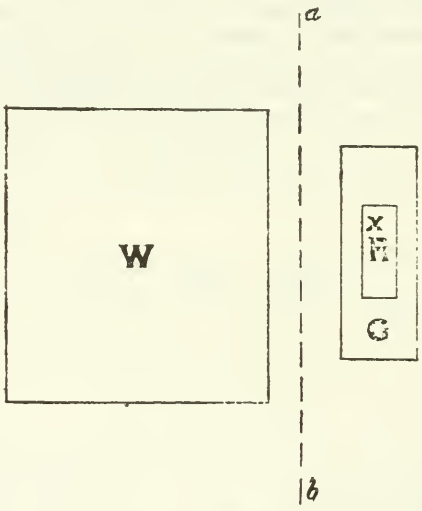

FIG. 20.

which R, B, G and P become reversed to their complementary colours, and even when I fixate a strip of Y paper and after thirty seconds cast a shadow upon it, it becomes not B but R, and it is only after more prolonged fixation that diminishing the illumination will make it change to B. This lesser tendency of Y to give place to its complementary colour is, I think, due to the fact that in my case the B system is less vigorous and self-assertive than the G and R systems, a fact other indications of which I shall point out below.

One other observation seems to find its proper place here. Just as a patch of colour may be changed to its complementary colour by diminishing its brightness after a period of

fixation of thirty seconds or more, so it may be changed by adding W light to it.

Observation XXXIV.—I laid on a dark table a sheet of W paper and beside it a broad strip of G paper with a smaller strip of R paper upon it as in figure 20. With my right hand I held a sheet of plane glass vertical to the table along the line *a b*. In my left hand I held a large sheet of S paper which I laid over the W sheet. I then fixated the point × looking down upon the coloured slips obliquely through the glass plate. If I then withdrew at once the S paper so as to uncover the W paper, the W light from it reflected in the glass mixed with the R and G of the coloured slips and considerably reduced their saturation. But if I continued to fixate for thirty seconds or more while the W paper remained covered and then exposed it, the G and the R were both changed to their complementary colour, which of course was mixed with the reflected W light and therefore of lower saturation than the strips themselves; so that in place of a R strip lying upon a larger G strip, I saw a B-G strip lying upon a larger R strip. On continuing the fixation with the W paper exposed, the colours passed slowly back through a neutral tone to the original R and G mixed with W.

This reversal of colour may be very conveniently observed by the use of the apparatus for testing for colour-blindness devised by Hering and made by Rothe. If the two halves of the circle be made R and G respectively, and W light thrown in after fixating for thirty seconds, the R and G semicircles became G and R respectively.

Monocular Struggle as Observed in After-images.

In section iii. I have advanced the view that, by the action of light upon the retina, substances (which I there called X-substances) are set free which, by a further chemical change capable of proceeding in the absence of light, but accelerated by the incidence of light-rays, excite the endings in the retina of the fibres of the optic nerve, and I suggested that after-images are due to the persistence in the retina of the action of the excess of these X-substances set free and not used up during the action of the light. In dealing with the after-images of W light I did not attempt further to define these X-substances.

Young's theory demands three such substances, R, G and B X-substances, and we have seen that it is necessary in the light of modern research to add a fourth, a W X-substance,

having its seat in the rods and in all probability of small importance in vision in ordinarily bright light, while the R, G and B X-substances must be assigned to the cones. After stimulation by bright W light, there must then be present and active in the retinal area affected all four X-substances.

Since monocular struggle of colours, involving, as it does, the complete fading of the parts of a compound image due to the activity of one or two of the three colour systems, can occur during the fixation of an unchanging patch of light, when all the sensation elements are reinforced by the activity of the ocular muscles, it is to be expected that it should occur much more readily in the case of after-images, if the view of their nature indicated above be the true one. After what has gone before it must be obvious to any one who will make the necessary observations that the familiar phenomena of '*farbiges Abklingen*' of after-images is simply a case of monocular struggle.

Fechner, who described the phenomena of '*farbiges Abklingen*' very carefully,[1] did not offer any satisfactory explanation of the successive appearance of the colours. At that time Hering's theory had not been proposed or doubtless Fechner would have applied his observations to the refutation of it.

Helmholtz accepts Fechner's account of the phenomena but does not throw any new light on the subject.

Unfortunately Fechner described the phenomena as resulting from what he called '*Blendung's Bilder*,' and his splendid enthusiasm led him to do very serious injury to his eyes by gazing at the sun in order to observe them. This name and this deplorable result, together with the warning given by Helmholtz in this connexion, have tended, I suppose, to make observers shy of the subject and to create the impression that there is something abnormal and quasi-pathological in the whole series of phenomena.[2]

Hering[3] puts aside the whole subject with the remark that

[1] *Pogg. Analen.*, Bd. l.

[2] Fechner seems to have exposed his eyes to unnecessarily bright light. I have not found it necessary to fixate a brighter light than bright sunlight transmitted through ground-glass, and this only very rarely. Although I have many times fixated very bright lights for periods ranging up to ninety seconds and less bright lights for periods ranging up to fifty minutes, my eyes do not seem to have suffered appreciable injury from the work. In fact, a prolonged fixation produces now less discomfort about the eyes than when I began to work at this subject. The only ill-effects that have made themselves felt have been slight deep-seated headache, passing off in a few hours, and slight inflammation and thickening of the eyelids, passing away always during a few weeks' rest.

[3] *Zur Lehre vom Lichtsinne.*

the colours that appear in the after-image of W light are of low saturation and due to feeble unnoticed coloration of the seemingly W light, while Müller has not yet attempted to deal with it.

Miss Washburn[1] has recently given an account of the '*farbiges Abklingen*' following fixation of patches of white cloud, and her descriptions agree in the main with Fechner's and with those given below, but for the purposes of this essay it is necessary to describe the phenomena anew and to point out some features not hitherto described, so far as I have been able to ascertain. For this purpose I have made series of observations on the after-images given by W light of different intensities, using as source of light sunlight and light from W clouds transmitted through plates of ground glass and milk-glass, as well as patches of sky and cloud and pieces of W and grey paper exposed to daylight of all degrees of brightness, and also the light of the incandescent gas-lamp transmitted through ground glass and milk-glass. In the case of all but the brightest lights it is advantageous to use a shaded disc as the source of light, else the after-image is complicated by the presence of a halo. Some of these observations are partially described in section iii.

I there mentioned that in all cases of stimulation by W light, except in the case of the dullest light that will yield an after-image in the dark, there appears some coloration of the after-image, and that the colours are of low saturation in the after-image of dull W light, and are more saturated the brighter the light. The colours that I usually see in the after-image of dull W light are R and G. Sometimes in the first one to two seconds after the exclusion of the light it is impossible to make out any definite after-image although one may have an indefinable sense of something going on in the area of the retina affected. Sometimes a grey and sometimes a B of very low saturation, *i.e.*, a bluish-grey, follows immediately. A few seconds after exclusion of the light a R of low saturation almost invariably appears, persists for a variable period according to the brightness of the light, and then enters upon a dull patchy struggle with G, in which the G, also of low saturation and brightness, soon gains the upper hand and then persists as long as the after-image is at all visible. With a still dimmer grey light or a fixation of shorter duration the after-image is merely a fuzzy grey patch that dies away in the course of a few seconds.

If the W light fixated be rather brighter, the colours

[1] *Psych. Rev.*, vol. vii.

appear more saturated but run much the same course. The last stage is always in my case a dark G of fair saturation fading slowly away. The R preceding the G is rather less constant in its appearance and the B of the first few seconds, though frequently perceptible, is the least constant and often it is replaced by a violet tinge which quickly gives way to R or G.

If, in the above cases, a sharply bounded patch of light be fixated in place of the shaded or half-shaded disc, the play of dull colours in the after-image can usually be observed equally well, unless the fixation has been continued for a considerable time, in which case the halo is usually bright enough to inhibit the activity of all the colour systems, including the W system, in the area of the after-image for part or the whole of the duration of the after-image, so that the so-called negative after-image of W light appears, as described in section iii.

With still brighter W light the colours of the after-image gain in saturation and also in constancy of appearance and sequence, until when a W light, that is bright enough to be slightly dazzling, is fixated for a period not less than fifteen seconds the appearance and sequence of the colours is almost quite constant. Such a degree of brightness I obtained by reflecting sunlight from a flat mirror on to and through the sharply bounded disc of milk-glass. The milk-glass cuts off a very large proportion of the light so that the disc seen from the dark room is by no means very dazzlingly bright. With such a disc I made the following series of observations.

Observation XXXV.—In each case I fixated a dark spot near the centre of the disc, with both eyes at a distance of 18 inches, and then suddenly shut off the light by releasing the photographic shutter.

(*a*) Fixation for half a second. After-image—an evenly bright B of fair saturation which becomes less saturated and gives way after twenty seconds to a dark G that slowly fades away.

(*b*) Fixation for five seconds. After-image—during first one to two seconds I could distinguish nothing definitely, then emerging as out of a haze appeared a bright R disc which became momentarily Y several times as it struggled with G and then gave way after thirty seconds to dark pure G, which faded slowly away in about sixty seconds.

(*c*) Fixation for twenty seconds. After ten seconds' fixation the W disc became bright G of increasing saturation. After-image—a very bright yellowish-G disc with narrow R border. The Y-G begins at once to recede from the R border and

then comes and goes in patches on the now R disc. The patches of Y-G continually diminish in size and are confined more and more to the centre of the R disc, until after two minutes the R disc remains of pure very saturated R with a narrow B border. It remains thus for seventy seconds and then the R begins in turn to recede towards the centre, while the B border spreads inwards, until the whole appears as a pure B disc with small patches of R struggling with the B about its centre. Then the disc remains for about fifty seconds a pure saturated B which then gives way rapidly to pure dark G, and this fades slowly away in about one minute.

I have chosen this series for description because it proves, if any proof be needed, that the colours of the after-image of W light are not due to unperceived coloration of the W light, as Hering has suggested, for in this case the same W-light is followed immediately according to the period of fixation by B, R or G.

Of the three after-images described above the third is the most important, for it presents most of the features that appear very constantly in my own case after fixation, for not less than fifteen seconds, of bright W lights of all intensities except the very brightest that can be easily borne. The G of the first phase varies, according to conditions which I have not been able to determine, from a very pure saturated bright G to a bright golden Y. When the latter appears there is always visible a R border to the disc. Frequently a pure bright G disc develops a R edge and then the G becoming yellower retreats upon a R ground towards the point of fixation. This retreat of the colours towards the point of fixation is a very constant feature. Each of the primary colours appears in turn at the edge of the disc as a border to the colour in possession of the field, and then as the latter retreats towards the point of fixation the former appears as the ground upon which the latter struggles in patches before it disappears and leaves the former filling the field. During the struggle the retreating colour sometimes appears as a veil through which the other colour is seen. This feature, the retreating towards the point of fixation, is probably an indication of the fact that the colour systems are most vigorous and fully developed in the fovea centralis in the retina, and in the corresponding parts of their cortical levels.

Observation XXXVI.—One more example of the '*farbiges Abklingen*' when still brighter W light is used, namely, sunlight transmitted through ground-glass; this is a W light of dazzling brightness. I fixated a point on the ground-glass for twenty-five seconds. The after-image appeared at

once as a brilliant bluish-W disc. This persisted fifteen seconds and then became B-G with a G edge, and then the B retreated rapidly towards the point of fixation and disappeared, leaving a bright pure G disc; this, developing a R edge, persisted unchanged for about sixty seconds; then G began to retreat and appeared as Y-G patches struggling upon a R ground and becoming more and more Y until they disappeared leaving a pure R disc with a B edge. After persisting unchanged about twenty seconds the R struggled on B in just the same way and then disappeared leaving a disc of pure rich B. The B remained unchanged forty seconds and then struggled with and gave way to G, which then persisted to the end, fading slowly away.

The two observations last described illustrate a very constant feature of such after-images, namely, the tendency of the three primary colours to follow one another in a recurring cycle of the order G, R, B, G, R, B. In the one case the cycle passes from G to G in the other from B through G R B to G again, thus almost completing the double cycle. If the W light be only moderately bright R is usually the first colour to appear and is then succeeded by G which persists to the end. After brighter light G comes first and is succeeded by R then B and then G again. If the light be still a little brighter the G is usually mixed with R from the first, *i.e.*, it appears Y and has a R edge; and if the light be very bright then the first phase of the after-image is W or bright B of very low saturation, *i.e.*, a mixture of all three colours in which B slightly predominates. The B then soon passes through B-G to pure G which is then followed by the cycle of pure colours.

An important feature of the after-images of bright W light is that, after the first short period in which two colours fuse to give Y, or, as is the case after the brightest lights, all three fuse to give W, *the colours that in turn occupy the area of the after-image, alone and unchanging for considerable periods, are R, G and B only, and these are in every case of exactly the same colour-tone although varying in brightness or intensity in different cases and in different stages of one after-image.* The R is a rich crimson R, decidedly less orange than the R of the solar spectrum, the B is a rich ultramarine B, and the G a pure G which I can only describe as having no inclination towards B or Y. They seem to agree as closely as possible with the colours which Herr König and Herr Dieterici have deduced as the desirable primary colours (*Grundempfindungen*) from their experiments in colour-mixing and which they describe as a R inclining somewhat

from the R of the spectrum toward P, a G of wave-length 505 $\mu\mu$ and a B of wave length about 470 $\mu\mu$.[1]

They are the purest, richest, most saturated colours that I have ever experienced, and I believe that in this way, and this way only, one may experience absolutely simple, i.e., *unmixed and fully saturated colour-sensations.*

These are the only colours that fill the whole area of the after-image at any time after the first few seconds. In the periods of struggle small patches of mixed colour may appear for a few seconds, especially at the edges of patches of the retreating colour as they struggle upon the other coloured ground. The Y which frequently follows at once upon the W light always reveals its mixed character by resolving itself into G struggling upon a R ground, or more rarely into R struggling upon a G ground.

After what has gone before, the explanation of the principal features of '*farbiges Abklingen*' is obvious. During the action of W light on an area of the retina there are set free in it R, G, B and W X-substances. When the light ceases to reach the retina the excess of these substances remains and continues to excite the four sets of nerve endings, those of the R, G, B and W systems respectively. If the W light is feeble there is set free a relatively large amount of the W X-substance, for this system is especially adapted for stimulation by light of low intensity. In the after-image the W element therefore predominates, and if the W light be dull enough the W system alone may excite the after-image. Brighter W light sets free larger amounts of the R, G and B X-substances, both absolutely and relatively to the amount of W X-substance. With the increased intensity of the colour-processes, corresponding to the larger amounts of X-substances remaining after the light is shut off, the antagonism between the colour-processes becomes more acute, and the duration of the after-image is greater. Hence, with increasing brightness of the W light fixated, we see colours of increasing purity, and each of the three primary colours predominates in turn. In the period immediately following the shutting off of the light the colour-systems tend to function together, probably because the intensity of their excitement is unfavourable to 'complete fading'. But the increasing fatigue of the cortical levels and the diminishing intensity of the retinal processes favour the occurrence of 'complete fading' until one or other colour-system is enabled to predominate over the others. While, then, the cortical area of

[1] *Zeitsch. f. P. u. P. d. S.*, Bd. iv., S. 343.

this one system, say the G system, remains active, the activity of the corresponding cortical areas of the R and B systems are inhibited by the activity of the G system. They remain at rest, and recovering more or less from their fatigue, while the fatigue of the cortex of the G system is increasing, one of them, usually the R system, soon triumphs over and inhibits the activity of the cortex of the G system. The R cortex then functions alone for a space until the B cortex, being still further recovered from its fatigue, triumphs in turn over the R. The B cortex yields in turn to the G which has now enjoyed the longest period of rest. *Hence the regularly recurring cycle of colours—each colour-system is continuously excited by the appropriate X-substance in the retina, but, owing to the mutual antagonism of the cortical activities of the three systems, that of one inhibits that of the other two systems, the conditions being favourable to 'complete fading,' until in turn it is inhibited by the activity of the more rested of the other two.*

What determines the order of precedence of the predominance of the colour-systems it is hard to say. The frequent predominance of G in the first stage seems to be due to the fact that the G systems of my eyes are more vigorous than the others, the R and the B systems, a fact of which other indications will be noted below. But however this may be, it is clear that, when any one colour-system has once gained the predominance, the cycle is set up and must recur so long as there are the three X-substances at work in the retina.

One more feature of the after-images of bright lights is noteworthy and not, I think, described by Fechner. When the colours have quite died away, and can no longer be recalled by admitting light to the retina or by other means, there is usually visible a dull fuzzy grey occupying the area of the after-image, but distinguished from all the preceding phases of the after-image by its lack of definition; thus if the object fixated was the window-frame against a bright sky, the cross-bars of the window, which appear more or less clearly defined in all the coloured phases of the after-image are not to be made out in this last phase and the borders of the after-image are not sharply marked but fade away gradually into the darker surrounding area. If, during this stage, the eyes be opened and directed towards a dull W surface a patch, corresponding in shape and position to this last phase, appears slightly darker than the rest of the surface.

The hypothesis at once suggests itself that this dull grey after-image, which survives the after-effects of light on the colour-systems, is due to X-substances of the W system still remaining in the retina. This suggestion finds support in

the fact that in its peculiar indefiniteness of outline it closely resembles the after-image that follows stimulation by W light too feeble to produce a coloured after-image, and this, as we have already seen reason to believe, is due to the W system acting alone. If, as there seems good reason to believe, this W system is specially adapted for vision by light of low intensity, then stimulation by fairly bright W light must be for it a maximal or very violent stimulation, which may completely decompose all the available mother X-substance of the W system. There would then be set up in the W system a condition similar to that produced in the whole group of systems by excessively bright light, such as direct sunlight. The effects of such stimulation I have already discussed in section iii., and it is only necessary to point out that, if we assume the condition of affairs thereby set up in the whole group of systems to be in this case confined to the W system, we have a satisfactory explanation of this last phase of these after-images. The diffuse character of the after-image having its seat in the W system must be due to a greater diffusion of the W X-substance than of the X-substances of the colour-systems, and when we remember that the rods, the seat of the W X-substance, are much more closely packed together than the cones, this feature too becomes intelligible.

In my eyes the G apparatus seems to be the most vigorous and self-assertive of the three colour-systems, for as in the case described above (observation xxix.), it always predominates first over the other two, during fixation of bright W light, and it usually predominates in the first phase and alone affects consciousness in the last coloured phase of the after-image of bright W light. This is further borne out by the facts that a same-coloured after-image appears more readily for G light than for other coloured lights and is then more persistent, that G shows the phenomena of reversal less readily than R or B, and that a bright Y light always becomes and remains G after perhaps a short R phase.

In respect to the relative vigour of the three colour-systems there seem to be considerable individual differences. Of three other subjects of whose vision I have made some slight investigation in this connexion, in one the R system seemed to correspond to my G system in being relatively more vigorous than the other two, for in his case same-coloured after-images of R occur most readily, R predominates in and forms always the last slowly dying phase of the after-image of bright W light, and a bright Y light always becomes for him a blood R and remains so during prolonged fixation.

In the second subject the B system seemed to be the most vigorous, for in the after-image of bright W light B always appeared early and formed the last coloured stage which in my case is always G. In the third subject the relative vigour of the three systems seemed to be the same as in my own case.

Observation xxxv. has already shown the futility of Hering's suggestion that the colours which appear in the '*farbiges Abklingen*' are due to unperceived coloration of the W light fixated, for it shows that according to the duration of fixation the same W light may be followed immediately by R, G or B. Further, the colours appear after stimulation by every variety of W light that is bright enough to give more than a very dull grey after-image, after fixation of every kind of W paper exposed to all varieties of direct and diffused sunlight and of every shade of grey and white cloud. Hering also remarks that the colours of the after-image of W light are of low saturation. I have already stated that in a good case of '*farbiges Abklingen*' the colours that appear are the richest and most saturated colours that I have ever experienced, but the following simple observation will add weight to this testimony.

Observation XXXVII.—I fixated for a few seconds through the upper part of the window a patch of bright W cloud. With covered eyes the after-image appeared a rich G, and on projecting it on to a sheet of W paper exposed to bright diffused daylight it still appeared as a G of very fair saturation.

The observations described above in this section are sufficient, I think, when viewed in the light of the foregoing sections, to prove the mutual antagonism of corresponding cortical areas of the different colour-systems and the occurrence of monocular struggle. *This antagonism, or tendency of the activity of any part of the cortical area of one colour-system to inhibit the activity of corresponding parts of the cortical areas of the other two colour-systems, exists then between the different colour-systems whether they belong to the same eye or to the right and left eyes respectively; but in the case of systems belonging to the same eye the antagonism is much weaker than between systems belonging to opposite eyes, and in the former case it makes itself felt, during the action of light in the retina, only under special conditions.*

This antagonism between the colour-systems of the same eye is indicated in the diagram, figure 15, by the broken line joining corresponding points of the cortical areas of the three systems. Throughout this section I have assumed that the psycho-physical processes underlying the sensations of R, G

and B go on in three anatomically distinct sets of neurons, as represented in the diagram (figure 15). The neurons of the three sets forming the colour-apparatus of either eye might of course be interwoven with one another in such a manner that no coarse lesion could affect those of any one set without also affecting those of the other two sets. We have no *a priori* ground for assuming that the three psycho-physical processes may not consist in three different kinds of activity in one set of neurons, but I think the phenomena of monocular struggle and their essential similarity to those of binocular struggle, as demonstrated above, go far to prove the truth of the view that the R, G and B psycho-physical processes take place in three distinct sets of neurons. It would be highly satisfactory if we could suppose that the R, G and B X-substances are set free equally in all the cones and that each cone is capable of three corresponding kinds of excitement, and that it makes connexion in the retina with three kinds of fibres, each capable of taking up one kind of excitement from the cone. But the number of fibres in the optic nerve (Helmholtz, *Phys. Optik* S. 263) seems to be smaller than the number of cones, and it is perhaps necessary to assume that the fibres of the optic nerve concerned in colour-vision are capable of three kinds of excitement each of which diverges into its proper track at a higher level. In this connexion it is interesting to note that the fibres of the optic radiation, *i.e.*, the fibres connecting the lower cerebral visual centres to the visual cortex, are much more numerous than the fibres of the optic nerve; according to Prof. Flechsig, five times as numerous.[1]

In the succeeding sections I have to show firstly, that the theory of simultaneous contrast suggested in section iii. holds good also for simultaneous colour-contrast, and secondly that monocular struggle plays an important part in the after-images of coloured lights, and that it is the key to the understanding of certain phenomena that hitherto have been stumbling-blocks in the way of Young's theory.

[1] Die Localisation der Gestigen Vorgänge. S. 37.

(*To be concluded.*)

V.—CRITICAL NOTICE.

Die Analyse der Empfindungen und das Verhältniss des Physischen zum Psychischen. Von Dr. E. Mach, Professor an der Universität, Wien. Mit 36 Abbildungen. Zweite vermehrte Auflage der Beiträge zur Analyse der Empfindungen. Jena: Verlag von Gustav Fischer, 1900. Pp. 237.

The first edition of the present work under the title *Contributions to the Analysis of the Sensations* was published in 1886, and consisted in a series of specific analyses of the various sensations, introduced and rounded off in the first and last chapters respectively by discussions of a more general kind.[1] The book in its earlier form had thus a certain symmetry of its own, despite the fact that it was largely, even at this its first appearance, a mere compilation of material published elsewhere. As a highly qualified reviewer—C. Stumpf—remarked at the time, Mach had put together in the edition of 1886 a number of scattered studies, previously incorporated in his published works, and added to these a series of new facts and points of view. In the early nineties, I believe, an English translation was made of this work by Mr. C. M. Williams and published by the Open Court Publishing Company, Chicago. This was in itself a second edition, as it included the insertion of a new chapter—the second chapter in the present edition—and other notes and alterations. In the present edition are added four other chapters, in addition to many new sections and paragraphs.[2] The new chapters are interpolated between the

[1] Good reviews of the first edition may be found, among other sources:—
1. In the *Deutsche Litteraturzeitung*, Nr. 27, 3 Juli, 1886, by C. Stumpf.
2. In the *Philosophische Monatshefte*, Bd. xxii., p. 207, by Elsas.
3. In the *Revue Philosophique*, 1887, p. 80, by Lucian Arréat.

[2] The new chapters are those entitled: 'Ueber vorgefasste Meinungen,' 'Mein Verhältniss zu R. Avenarius,' 'Physik und Biologie.' 'Causalität und Teleologie,' 'Der Wille,' and 'Empfindung, Gedächtniss und Association.'

Of the other new insertions, the following are those of most interest and importance:—
P. 3, footnote, an illustration from personal experience.
P. 23, § 14, with the exception of the last three paragraphs.
P. 46, § 3, paragraph 2. on the principle of Psychophysical Parallelism.
P. 82, § 9, on the distinction between right and left.
P. 86, § 13, on the æsthetic aspect of certain spatial sensations.

old in a somewhat puzzling and irregular way, and the original symmetry of the old edition almost completely lost. What is also lost sight of in this intershuffling of the chapters, new and old, is the unity of idea running through the new, a unity quite sufficient to have justified their being included together either at the beginning or end of the book, whereby the useful compactness of the first edition would have remained unbroken. This unity of idea characteristic of these newer chapters is indicated in the new title given to the book in this second issue. The present volume deals not only with an Analysis of Sensations but also with the relation between the physical and the psychical. The new chapters deal either directly with this relation or indirectly with questions that develop out of it, and show generally that during the fourteen years' interval between the issuing of the two editions the author's time has been largely busied with the study of organic and mental science.

The central idea of the first of these newer chapters is contained in Mach's conviction that the dualism between physical and psychical is an artificial conception, the genesis of which can easily be traced. The physicist works in his own sphere with such abstract concepts that he comes entirely to overlook the sensations whence these concepts have been abstracted. An artificial gap is thus created between the physically conceived objects and their

P. 90, § 1, Historical résumé of the theory of spatial vision.

P. 140, § 11, paragraphs 2, 3, on an experimental discovery of the author's.

P. 157, § 1, with the exception of the first paragraph.

P. 174, § 6, on Helmholtz and his critics.

P. 177, § 8, on Stumpf's criticism of Helmholtz's Theory.

Pp. 197-203, §§ 18-21, § 21, containing the author's view of the value of Helmholtz's Theory.

In the last chapter the more interesting novelties are: §§ 2, 10, 12 (the three last lines), 14, all except the first seven lines, the last paragraph of § 16, the two last paragraphs in §§ 17 and 19, and paragraphs 5, 7, 8, 9 in § 21.

The changes in arrangement consist: —

1. In restoring to the text nearly all the longer footnotes in the first edition.

2. In a consequent rearrangement of the sectional divisions.

3. In certain changes in type. Of these latter the two most interesting instances occur: on p. 19, where the words 'So ist ein mannigfaltiger Zusammenhängender Inhalt des Bewusstseins um nichts schwerer zu verstehen, als der mannigfaltige Zusammenhang in der Welt,' are transferred from ordinary to special type, and on p. 115, where the word 'Eine' is transferred from special to extra-special type.

4. A few excisions, very few, have been made from the first edition. Thus a somewhat long and technical footnote (pp. 162, 163 in first edition) is missing in the second edition at the foot of p. 230, where it would otherwise have figured.

5. The Index at the close of the volume is also a new feature of the second edition.

relations, on the one hand, and the sensations they awaken on the other. These latter are therefore looked upon by the physicist as something completely extra-physical, fundamentally different from physical objects and relations. The psychologist accepting from the physicist this treacherous prepossession born of the methods of physical inquiry takes Sensations as his peculiar subject-matter and assigns the objects of the physicist to a realm entirely beyond the closed sphere of sensations.

The main flaw in this whole procedure lies, according to Mach, in the physicist's conception of his concepts. These concepts are not in reality mere abstractions severed from the sensations which they serve to combine and to unify, but connote only certain definite regular connexions between the sensed elements themselves. The data of Physics so conceived not only cease to be fundamentally different from the data of Psychology but are seen to be identically the same. Physics and Psychology differ in the species of regular connexion between the sense-elements which they respectively investigate, differ that is in their purpose and point of view, but they both agree in starting from the same data.

Now, what are these data, 'these simplest of the building-stones out of which the physical and also the psychological world are built up'? (p. 31). They are the simple elements out of which our sense-presentations—what we call material objects—are compounded. They are the series of colours, tones, smells, tastes, touch sensations, time and space sensations, etc. Thus 'green' or the 'odour' of a rose are elements. Mach's position here is eventually the same as that of common sense; the only difference is that Mach has the analytic instinct that common sense does not possess. The simple elements for common sense are *things*, things that can be seen and handled and give out pleasant sounds, can be tasted, smelt and moved. These are for Mach *complexes* of simple elements, the simple elements being the sensations out of which these complexes are built up. Still apart from this one difference none other of any note exists. These sensations or simple elements are the ultimate data of experience and must be accepted as such by any one who hopes to do anything profitable in this world. Only the idle metaphysicians can afford to view them with suspicion and seek to pierce beyond them. They are for all other folk, for the scientific as well as for the practical—the two really estimable classes, in Mach's opinion—immediately and unquestionably given to us (p. 34).

The dualistic cleft, then, between the physical and the psychical does not really exist. Any single element, so Mach maintains, belongs at one and the same time to two very different but by no means antagonistic contexts. The element 'green'—not the concept, of course, but the actual sensation—has its place amid all the gigantic complex of similar elements which make up the material world. As such it is a *physical* element, and the relations in which it stands to other elements are what the physicist

must study But the element 'green' enters also into relations of reciprocal dependence with the observer's body. It is bound up with his retinal processes. As such it is a stimulus that affects the nervous system in certain specific ways which can, in principle at least, be studied by the physiologist. So considered, 'green' is a *psychical* element, a *sensation.*

The chapter that follows the one we have just analysed is mainly devoted to developing these convictions concerning the relations of the physical to the psychical. This is picturesquely done through a personal statement of the author's relation to the late Prof. Avenarius. The comparison is a peculiarly interesting one, and constitutes, perhaps, the most welcome and novel feature of the new edition. Mach confesses at the outset that the relation between himself and Avenarius is as close a one as could possibly be expected to exist between two individuals who had grown up under different influences and pursued different vocations.[1] The closeness of the kinship was, however, concealed by the fundamental difference of style between the two thinkers. The style of Avenarius is rendered crabbed and difficult through the use of a strange terminology. It was asking a great deal of an elderly man, says Mach in his delightful way, that in addition to learning the many languages which different people speak, he should also learn the speech of a private individual. To this difference between the lucid, untechnical language of the one and the highly ponderous and technical speech of the other must be added an essential difference in form of presentment. Avenarius was a systematic philosophical thinker; Mach claims to be neither a philosopher nor a systematist. He repudiates every title, indeed, save that of a man of science. He claims to be a natural philosopher in general and a physicist in particular, but will not allow himself to be called a philosopher, nor even a physiologist or psychologist. Moreover, he has a rooted diffidence of system as of something that tends to squeeze the truth into its own predetermined mould. He calls his own book an *aperçu.*

Now these differences, though they hindered for long any clear mutual recognition between the two thinkers, were superficial. The points of agreement were, on the contrary, fundamental. Mach lays stress on two of these as essential. In the first place, both he and Avenarius agreed in holding that the essential aim of all scientific labour was to reconstruct the facts of the universe in the most economical way possible. This view is definitely brought forward by Avenarius in a treatise entitled 'Philosophy as That Which Thinks the World According to a Principle of Least Effort,' and by Mach in an essay on the 'Economical Nature of Physics'.

[1] Avenarius started from a realistic standpoint; Mach, after reading the *Prolegomena* at the age of fifteen, from an idealistic standpoint. Avenarius, again, was Professor of Philosophy at Zürich; Mach, Professor of Physics at Prague, and later on, Professor of Scientific Method at Vienna.

Is not the task of Science, writes Mach in another essay,[1] to acquire with the least possible work, in the least possible time, with the least possible thought, the greatest possible part of eternal truth?

The second main point of agreement brings us back again to the main idea which dominates the freshly added matter in this second edition, to the relation, that is, between the physical and the psychical. In this central issue Mach and Avenarius are in perfect agreement. Herr Dr. Rudolf Wlassak, in a letter to Mach, given verbatim in this chapter, makes on this point the following statement: 'The conception of the relation of the physical to the psychical is the same with both Avenarius and Mach. Both arrive at the result that the distinction between the physical and the psychical lies only in a difference in the relations through which an object is dependent on others. . . . If I investigate the dependence of an object A on a second object B, I am pursuing a physical inquiry; if I ask to what extent an object A is changed by changes taking place in the sense-organs or central nervous system, I am pursuing a psychological inquiry.' The writer of this letter then proceeds to develop Avenarius's theory of the origin of dualism through the fallacy of Introjection, and points out that Mach has hardly done justice to this explanation. Mach admits this in an after-note, and states afresh that he does not believe that Introjection played more than a subordinate *rôle* in the development of dualistic views.[2]

In the development of the Mach-Avenarian theory of the relation between the physical and the psychical, as given in this interesting chapter, two new points are explicitly brought forward by Mach himself. The first is, that the psychical life may be profitably conceived as a *biological phenomenon* (*Erscheinung*), and the second, that in so far as we consider what is psychical from this point of view, we must look upon it as having a physical foundation and as being physically determined.[3] The comparison

[1] On 'The Forms of Liquids,' *Popular Scientific Lectures*.

[2] See also footnote, p. 19.

[3] This second point is discussed by the author in two new additions peculiar to the second edition, to be found on pp. 46 and 229-230 respectively. In the first of these contexts we find that this dependence of the psychical on the physical is involved in Mach's definition of what he means by a principle of Parallelism. Given that a leaf, as seen by the eye, is something psychical in so far as it is considered as dependent on the brain-process involved in the vision, whilst this brain-process itself is something physical in so far as the mutual relations of its elements are concerned, then the principle of Parallelism consists in the statement of the dependence of the first immediately presented group of elements—the visual sensations of the leaf—on the second group of elements—the brain-processes involved.

On the other hand, we are told, on pp. 229-230, that the meaning of 'determination' itself is only made intelligible to us through psychological investigation. It is only through its life as an idea that a fact is

of the physical with the psychical from this new standpoint is carried on in the new chapter that follows on page 62, entitled 'Physics and Biology, Causality and Teleology'. Here Mach uses the term 'biological' in its widest sense; and in contrasting the inorganic with the organic includes under the organic all psychical as well as all vital manifestations. The main results of Mach's investigations are as follows: 1. There is no necessity for setting up a deep-going difference between investigations of a teleological and those of a causal kind. The former is good and useful in its place as an introductory to the latter. History has shown that this has been its true function. 2. By the causal idea Mach means no more than the concept of the dependence of phenomena, or rather, of their elemental characteristics on each other, and this he holds to be identical with the concept of 'function'. In the 'Functionsbegriff' Physics and Biology find a common working-idea. 3. At the same time this causal or functional concept cannot be applied by Physics to the problems of Biology without first gathering richer meaning through a close study of these same problems. As a dynamical system an organism offers many peculiar features. The functioning of a steam-engine cannot be studied as a substitute for that of a living body. The former may, in a certain artificial way, be made to procure its own fuel and to keep itself warm by means of it, but these properties are possessed by organisms even in their smallest cells, and organisms in addition can regenerate themselves through what they absorb, and grow and multiply. The physicist must, therefore, study Biology if he wishes to understand the full meaning of his own regulative concepts. 4. The *teleological* idea may still be usefully employed in default of the functional in dealing with certain aspects of organic life where animistic conceptions still give the best available descriptive statement. 5. What is, above all, needed to bring into line the study of the organic with that of the inorganic is the discovery within the realm of the inorganic of such fundamental psychical or rather vital properties as *Memory* and *Association*. Such functions as these proved common to both realms would be the starting-point of a new science dealing with the fundamental facts common both to the organic and the non-organic. So far nothing physical has been found to correspond to these psychical fundamentals of memory and association. The only hope of finding them lies in a study of the Physiology of the Senses, for here two forms of observation, the physical and the

taken out of its isolation, brought into contact with other facts, and *determined*, through the demand made upon it, that it shall harmonise with these and not involve anything of the nature of a contradiction. Hence, if Psychology has to recognise the physical basis of psychical life, Physics has no less to recognise that the definite determination of the connexion of the elements with one another, which is its ideal, becomes first intelligible in the light of those very psychical connexions. Thus 'Psychology and Physics lend each other mutual support, and only in their union build up a complete science' (p. 230).

psychological, come into mutual contact, and it is only through this mutual contact that such new facts as those proving the omnipresence of memory and association in some primitive form can possibly be forthcoming. In this last remark with which this chapter concludes we find an interesting commentary on the statement with which Mach opens his preface to the first edition, where he tells us that his repeated incursions as a physicist into Biology and Sense-Physiology was due to his deep persuasion that Science in general, and Physics in particular, must look to Biology, and especially to the Analysis of Sensations, for the next great step towards the elucidation of their fundamental principles.

A fourth new chapter is entitled 'Sensation, Memory and Association'. Here Mach reverts to this problem of an inorganic memory. Every physical event just as truly as every psychical event leaves behind it ineradicable traces. The physical traces are usually ignored, but this is only because of the abstract, schematic character of the physicist's interest and observation. They exist none the less. Indeed it must be so, for the psychical and the physical differ only in their form of observation. Mach does not, however, consider that this argument can justify his inferring in a stone memory of the typically organic kind, memory, that is, which reproduces as well as retains. All he feels justified in concluding is that the inorganic leaves traces of its previous activity in its own structure and that this fact of physical retention is sufficient to prove that in the physical as well as in the psychical realm there can be no such thing as a convertible process. The slight advance which this chapter contributes to the theory of an inorganic memory is contained in these admissions. Mach sums them up when he says that considerations such as these should show that whilst we are still very far indeed from possessing a complete grasp of the meaning of memory in physical terms, it is yet by no means unattainable.

The fifth and last in logical order of the new chapters is entitled 'The Will'.[1] Mach, like Avenarius, does not believe in a specific psychical causality but holds that all the phenomena of will proceed from the action of forces which he calls physico-organic. His own theory of volition he states as follows: Sense-stimuli can be partly or wholly represented by memory-images. All memory-traces retained in the nervous system co-operate with the sensations in discharging, reinforcing, inhibiting or modifying reflexes. Volitional movement takes its rise under these conditions, and may be regarded, in principle at least, as a reflex movement modified by recollections. . . . The essential difference between a volitional and a reflex movement lies then in the fact that the

[1] Of the five added chapters this is the one that best accommodates itself to the order given it by Mach. It follows a chapter in which the term 'will' has been used in a way that renders further elucidation quite necessary. A very similar remark applies, though in a less degree, to the chapter on 'Sensation, Memory and Association'.

determining-element in the former is found in the ideas (*Vorstellungen*) which anticipate the action.

The larger part of this short chapter, which contains many interesting observations, is devoted to the vexed question of Innervation. Mach agrees on the whole with James's peripheral theory of the origin of our sensations of effort, though he does not consider that this Theory has spoken the last word on the subject.

From the point of view of the logical development of Mach's thought, the guiding idea which animates and binds together these five added chapters, finds its natural origin and explanation in certain still more general ideas which are developed in the three 'philosophical' chapters which constituted the 'general' section in the first edition.

If we want to picture Mach in his true light we must start from those words in the preface to the first edition in which he tells us that the work which this volume represents was undertaken in sole obedience to the lively desire he felt for self-instruction.[1] That this is Mach's true attitude is attested on the one hand by the generous recognition he is always ready to give to any one who succeeds in improving upon his own attempts, and on the other by his still more eager readiness to put fact before theory. With this eagerness to find out the truth is associated a corresponding ardour in developing and applying it when found.

Our author had the great good fortune, as he puts it (see footnote, p. 21), to come across Kant's *Prolegomena* at the early age of fifteen. For two to three years after that date he pondered on the *Ding an Sich*, till on a bright summer's day in the open country the thought suddenly flashed upon him that the Thing in Itself was after all a useless burden, a mere idle fiction. This was the turning point in Mach's career. He had become convinced of three things:—

1. That Science was one as the world was one (Monistic moment).
2. That all metaphysical elements must be eliminated from scientific inquiry (Positivistic moment).
3. That Science must be set on a sensualistic basis, seeing that the world itself was made up of sensations (Sensualistic moment).

With the ardour of a young acolyte Mach set himself to apply his new-won insight to his own special province, Physics. The fight was long and strenuous (p. 21) and directed to the establishment of what we may fitly call a scientific monism. In cutting Physics loose from Metaphysics Mach's object was not to make Physics a self-sufficient, abstract, isolated Science, but to make its foundations so broad that they should enable the physicist to pass from his own subject to any other, say Psychology, without passing away from his own basis. Only in this way, according to Mach, could the unity of Science be secured. Hence Mach is

[1] *Cf.*, also p. 52, § 7.

as anti-mechanical as he is anti-metaphysical. The molecular theory of Physics is to him a parochial, *fach*-limited substructure which has to be forsaken so soon as the physicist sets foot within Psychology. Mach's monism is neither metaphysical nor mechanical, but scientific. It is a monism which asserts not that there is *one* explanatory solution of the universe, but that there is only one set of facts, sensations *or* elements, and only one real problem, that of discovering the laws of their interconnexion.

Mach is then first and foremost *a scientific sensationalist*. This creed is brought out clearly in the last chapter of the present volume which deals mainly with the topic of the adjustment of thought to sense. In the words that follow we have the pith of Mach's belief: 'The sense-apprehended fact is the point of departure and the goal of all the mental adjustments of the physicist'. His reasoning takes the following form:—

The disparity between fact and expectation brings about a disturbance of mental equilibrium which can only be quieted by a renewed mental activity which aims at removing the disparity by adjusting thought to the freshly discovered nature of the object (p. 214, § 7). Thus all science aims at a conceptual representation of sense-given facts, either to serve practical ends or to remove the sense of intellectual discomfort. Now unprejudiced reflexion teaches us that every such need, whether practical or theoretical, is satisfied so soon as our thoughts are able to *copy* completely the true likeness of the facts. This descriptive copying of the facts is thus the end or aim of Physics; atoms, forces, laws only the means for lightening the supreme task of imitation, means whose worth reaches only so far as they can subserve this end (pp. 209-211).

This process of adjustment of thought to sense has as its aim *Description*, and its method is that of *Conceptual Reaction*. We cannot explain the nature of things, we can only describe the various ways in which they affect one another.[1] Thus we have learnt all we can of a natural event, say an earthquake, when our thought has so contrived to grasp the totality of the facts involved that its representation of these facts can be considered as a substitute for the same. The aim of thought is to describe the facts of sense-perception. In order to do so thoroughly it has frequently to eke itself out with representative symbols and equations; but these are only means to an end.

Conceptual Reaction is virtually Mach's substitute for Abstraction, and is the name by which he designates the activity of thought in the descriptive interpretation of things. Such activity has two phases, one of *concentration* on certain sense-given elements, followed by an *expansion*-phase due to the fact that the effort of concentration brings the focussed sense-elements into contact with other sense-elements which extend and deepen its meaning. Mach compares this process of conception with that of a chemical reaction, as when a yellow or brown precipitate is

[1] *Cf.*, especially § 16, pp. 224-228.

gained from an originally colourless solution of salt by means of a specific operation. 'The concept of the physicist is a determinate activity of reaction which enriches a fact with new sensational elements' (p. 217).

Turning now to the chapter entitled 'The Main Points of View for the Investigation of the Senses' we find (p. 43) that this whole process of Adaptation of Thought to Sense as it takes place in Conceptual Reaction is guided by two important principles, the Principle of Continuity and the Principle of Sufficient Determination or Sufficient Differentiation. The former has its roots in the still more fundamental principle of Economy, and represents the conservative tendency, whereby habits are formed, of repeating ventures once proved successful and of applying for the elucidation of the new such laws of connexion as have already established themselves in previous experience. The latter represents a tendency of adaptation kept in check by the conservative principle from which it branches. If the old cannot explain the new it must be modified until it can, but no further. All such modifications, to be truly scientific, must be carried out in the spirit of this second principle.

Now as applied to the analysis of sensations these principles can be carried out only in conjunction with the fundamental principle which regulates the connexion between the physical and the psychical, but at the same time it is they which give to the latter its specific form. As interpreted in the light of the principles of Continuity and Sufficient Differentiation the principle of Parallelism requires that each sensation should be invariably accompanied by one and the same nervous process, and further, that each observed change in sensation should be accompanied by a corresponding change in nervous process. Mach means very seriously with this principle and proposes to apply it both in Physics and Psychology as a working-hypothesis of enormous range and power. Thus suppose a sensation has been analysed *psychologically* into so many mutually independent elements, the principle leads us confidently to expect that the corresponding nervous process will admit of being analysed up in a precisely similar way. If again two psychical properties of a sensation, say the pitch and intensity of a tone, are psychically inseparable, we may rely on the corresponding nervous process presenting corresponding physical features similarly inseparable (see § 4, pp. 47, 48).

It is in the light of this principle, so understood, that we can perhaps best see the force of Mach's introductory words in the preface to the first edition, words we have already alluded to. If the principle were true in the way suggested by Mach it would bring Physics and Psychology, through the medium of Sense-Physiology, into the closest possible touch. Given sufficient knowledge each would be continually suggesting by analogy principles and laws for the guidance of the other. It must also

be borne in mind that in the application of this principle Mach, like Avenarius, holds firm to the conviction that it is the physical which determines the psychical and not *vice versâ*. Finally, the importance which Mach attaches to this principle, and its equally obvious importance to all physicists if true, readily explains the fact that, in connexion with the sensationalistic *Grundanschauung* which supports it, it is the dominating idea in the new material of this second edition.

In the first chapter of this book, entitled 'Antimetaphysische Vorbemerkungen,' we gain just that insight into Mach's point of view which we require to complete the insight already gained. We see more clearly, in the first place, what Mach means by his scientific, sensationalistic monism and how he proposes to justify it. In § 10, pages 14, 15, we see this monism stated in the following form: Our perceptions, our images, our will, our feelings, in short the whole inner and outer world, are built up out of a small number of elements of the same kind (*gleichartigen Elementen*). This comprehensive statement is based on the following considerations. The constituents that enter into our trains of imagery are fundamentally the same as those that make up our sensations or perceptions,[1] what differs is only the form of association. Images in fact are not linked together after the same fashion as our sensations. Again, as all sensations pass gradually off into pain or pleasure, and as pain and pleasure make up the essential content of all the so-called feelings, and as the will is itself a modified sensation of movement, we see that feelings and volitions are also at bottom sensations. All the psychical life is therefore fundamentally sensational. And, finally, as the physical universe is made up of these very same elements, only considered in their varying relations to one another, we arrive at the monistic solution quoted above.

Of the intimate nature of these sensation-elements we can know no more than what is sensationally given to us. Each element, indeed, in its ultimate sensational character apart from its special connexions with other elements is an element in itself (*an sich*); it has its own given nature which sensation accepts without idly questioning whence. It has been said that Mach's 'facts' are 'relations'. This is true if by 'facts' we mean the data of scientific inquiry. It is not true if by 'facts' we mean the ultimate elements themselves as presented in sensation. These are not knowable relations, they are the ultimate unanalysable sense-elements between which these relations subsist. And yet Mach certainly does not conceive of these relations as superposed externally like a shifting network over the elements, but as concrete elements-in-relation varying their sensational appearance in some respect with each change in the relation. When he says of a colour that it is green in itself, he does not mean that the very same patch of green may not become in-

[1] Mach uses these two terms indifferently.

stantly yellow in the light of a sodium flame, but that wherever and whenever green is seen it presents itself as a sensationally-unanalysable-element-in-some-given-relation. Science must leave the unanalysable, elemental characteristic alone and apply itself solely to the analysable relations in which it stands to other elements in relation. 'Colours, tones, spaces, durations . . . are for us the ultimate elements whose given inter-connexions we have to investigate.'

Mach's monism is not a philosophical monism for the charmingly simple reason that he does not believe in the existence of any real metaphysical problem. Thus the old problem of the One Thing with its many qualities is the merest delusion. For the thing is one only as long as our purpose does not require us to consider it as multiple, and multiple only so long as our purpose does not require us to consider it as one. If we try to follow out the *two* purposes of thought *together*, which is like trying to move in two directions at once, we get our metaphysical problem, but only on a basis of self-contradiction (p. 5). So again the fiction of the thing in itself comes from our supposing that since we can abstract from this property or from that without destroying the relative permanence of the object, we may abstract from all its properties and still have something permanent left.

All metaphysical conceptions then must go. The so-called material bodies are mere complexes of elements, whose apparent thinghood and independence can be easily explained. For out of the primitive web of phenomena what is relatively permanent slowly asserts itself in the process of mental growth, impresses itself upon the memory, and expresses itself in speech; and the first complexes to make themselves felt in this way are the so-called 'bodies'. 'Things' have no scientific right of existence. It is the same with the 'self' or ego—'Das Ich ist unrettbar' (p. 17). The Ego is a changing complex made up of two complexes: (1) Body, (2) Psychical States, which stand in constant relation to each other.

We are left then with a purified scientific monism which is itself, like everything else, only justified in the light of a special end: the end of Science whose sole conceivable purpose is to give to man the completest possible information as to how he is to find his way about through the labyrinth of the universe (p. 26). If the end in view is merely *practical*, body and ego may be lawfully rehabilitated. They are convenient fictions, and in so far as they possess practical utility Mach feels tenderly towards them. Our author will bear with any dualistic view or with any other scientific fiction so long as it is held solely in the interests of practice. Within the practical sphere such views have *permanent* worth. Yet, and this is Mach's last word, the worth of a theory is relative only to the interest which it subserves (p. 27). 'No standpoint has absolute permanent value; each is important only in relation to a specific end.'

With the exposition of his more general views in Natural Philosophy Mach couples a series of most original and most interesting analyses of a purely scientific kind. These deal solely with the sensations of sight and hearing, and with the spatial and temporal and motor sensations that go with them.

The first of these analyses is entitled 'The space sensations of the eye'. Visual sensations, we read, may be analysed into sensations of colour and space-sensations (or sensations of form, though Mach does not use this term), for two objects may either agree in colour and differ in form, or else differ in colour and agree in form. Mach holds that our sensations of colour are chemically conditioned, whereas the sensations of space are mechanically conditioned. The former theory, according to which the light-vibrations are of the nature of chemical and not merely physical oscillations, presents this special feature of interest, that it is in apparent contradiction with Clerk-Maxwell's electro-magnetic theory. Mach's treatment of space-sensations is especially interesting. The two main points emphasised in the earlier chapter devoted to this subject are: (1) that geometrical congruence does not imply physiological or optical similarity. The former is to a large extent a perception helped out by the understanding (*Verstandessache*), the latter a mere question of similarity in *sensation*. Our author considers that attention was originally attracted to the straight line as an object of geometrical inquiry through its physiological or optical simplicity rather than through its property of being the shortest distance between two points. Still the optical and the geometrical are very closely related, and there can be no truly scientific geometry which does not aim at doing justice to both aspects. The Greeks emphasised the one; the Hindus, in their principles of symmetry and similarity, emphasised the other. Modern science must emphasise both.

The second main point in this chapter is the connexion of space-sensations with the motor apparatus of the eye. This apparatus is symmetrically adjusted for horizontal movements to left and right, but not so for vertical movements up and down, for in this latter case gravity aids the downward and impedes the upward movements. This fact of symmetry is of fundamental importance. For perfect symmetry means perfect optical congruence and the impossibility of making distinctions based on differences in sensation. Similar sensations are, in fact, connected with symmetrical motor functions. Thus whilst children are constantly confusing the letters *b* and *d*, *p* and *q*, they do not confuse *b* and *p*, *d* and *q*. The fact that we *are* able to distinguish between right and left with such precision Mach attributes to the original presence in the body, and brain in particular, of a very slight deviation from symmetry (asymmetric), sufficient however to secure our initial preference for left-handed or right-handed movements, as the case may be, the rest following according to the laws of use and disuse. In an interesting section, § 9, new to

the second edition, Mach gives evidence in support of his theory of an original 'asymmetry'. Thus he had it on the authority of an old officer that troops marching through a snowstorm in the dead of night, deprived of all external landmarks, would in their endeavour to keep straight ahead move in a circle of large radius, eventually returning to the same place from which they started.

In a second equally instructive chapter, entitled 'A Further Inquiry into Space-sensations,' Mach connects the preceding results with a theory of Innervation (*cf.*, p. 116). In this chapter Mach treats of space-sensations in conjunction with sensations of movement, and indeed treats more directly of the latter than of the former. His main thesis is the unconscious compensating movements of the eye in rotation, and of the whole body, indeed, when the body turns on its axis. In these compensating movements we find the reason, for instance, why external objects appear to keep still while we turn our heads round. In order to account for these compensating movements Mach postulates a central organ of innervation. As the net result of all his own researches and experiments our author considers that he is justified in concluding that every sensation of movement and space is reducible to *one* quality of sensation, the *will* to execute the movements of the eye, or the innervation itself. In a remarkable phrase, modified however in a second edition footnote, Mach tells us in fact that 'The will to execute the movements of the eye, or the innervation, is the space-sensation itself'. It is not surprising that Prof. Stumpf found these equations quite unthinkable. But we must remember that with Mach an act of will is simply a modified sensation of movement (*cf.*, p. 12, § 2 and the chapters on the Will).

In the chapter dealing with visual sensations (p. 125) Mach treats in detail a number of visual phenomena, especially those of monocular vision and perspective, and seeks to bring them under certain general physiological laws, mainly three in number, the law of Probability or Likelihood, the law of Parsimony,[1] and the law of Contrast.[2] Mach also detects in these phenomena the presence of a principle of sensation closely analogous to that of the conservation of energy (*cf.*, p. 135).

It is natural that one who believes in space-sensations should also believe in time-sensations. Mach believes firmly in a specific sense of time. Two bars of music with the same rhythm, but completely different in sound, are at once recognised as having the same time-form, just as in the case of two spatial objects of different colour and similar form, the similarity of form is at once recognised. In each case we are dealing not with an affair of the understanding, but with an immediate sensation. We appreciate these time-sensations, according to Mach, in the form of the working of attention,—a strange theory which Mach supports by the very questionable assertion that to attention that is riveted

[1] See pp. 137, 138, 142, 145. [2] Pp. 140, 141.

and strained time passes slowly, but quickly when the attention is only lightly engaged. Moreover, Mach seems to think that the maintenance of the blood-circulation might possibly be the physiological equivalent of this constantly experienced sensation of time. He gives striking examples in support of his thesis, but they are not convincing. Finally, he draws attention to the interesting fact that there is no such thing as *symmetry* in the province of rhythm and time. Thus two bars of music spatially symmetrical, as seen by the eyes, do not give any such feeling of symmetry when heard successively by the ear.

In his treatment of tone-sensations, Mach accepts in the main the results of Helmholtz, and endeavours simply to complete his theory in certain respects.[1] In particular Mach accepts in a modified form Helmholtz's physiological explanation of the organ of Corti. The fact that the successive tones are not only different but are arranged in a continuous series suggests however that each tone is a mixture of two partial sensations, one clear, the other dull, the relative proportion of clear and dull in any tone depending on its vibrational value. In this way we secure a continuity among tones analogous to that which obtains among colours. Again the fact that we can hear several tones together leads Mach to accept the suggestion of a Tone-space (*Tonraum*) in which these tones lie side by side. Finally, the fact that we can recognise as similar two intervals such as *cg*, *c'g'*, leads him to ascribe certain *Zusatzfärbungen*, or complementary colourings to each tone which would owe their origin to the susceptibility of each nerve-ending not only to its own specific rate of vibration but to vibration-rates that are multiples or sub-multiples of its own.

In the work we have just been considering we have an excellent example of the working philosophy of a man of science. It is an attempt to consolidate through Philosophy the interests of Science, and that in two ways: (1) by purifying it of all that is metaphysical; (2) by bringing its various parts into fruitful contact with one another. It is based on the conviction that the facts we have to understand are the relations in which sense-phenomena stand to one another, the permanent relations existing between the elements of sense, and that there are no other facts or anything else capable of being understood. This being the case, the function of Philosophy consists solely in reflecting critically upon the functions of Science and pointing out its sources of purity and strength. To be pure, the irrelevant must be weeded out, the irrelevant being just the metarelational, that is, the metaphysical. To be strong, the various scions of science, represented in last resort by the twin sciences of Physics and Psychology, must lend each other mutual aid.

Now, there is something very salutary and bracing about an effort of this kind, and were it undertaken with a due recognition

[1] See especially § 21 and the last paragraph of § 17.

of its necessary limitations, it would stand for a great achievement. At times the reader will imagine that his author has grasped the restriction well, for he is frequently asserting that his sole aim is to purify and unify Science so as to render it the most efficient and economical instrument possible. At other times we see quite as clearly that it is not only within the garden of Science that Metaphysics plays the part of a weed but that it is the absolute weed, the weed *an sich;* and that sensationalistic monism is by no means a mere useful hypothesis for enabling Physics and Psychology to share the fruit of each other's labours but a self-evident *Grundanschauung*, a *substitute* for all future metaphysic.

And yet, though Mach does not himself see any difference between these two positions, the difference undoubtedly exists. As a general theory of scientific method Mach's philosophy is excellent. Physics *quâ* Physics, *quâ* abstract science of modes of movement, has nothing to gain from good metaphysics and may be much hampered by bad metaphysics; hence the sooner it is demetaphysicised the better. Moreover, as a fruitful source of analogies Mach's conception of the rigid parallelism between psychical and physical should, under good control, be scientifically most valuable, in the dim future at any rate, and none the less valuable, for being so rigidly conceived. Finally, the primacy which Mach assigns to the concrete sense-phenomena over the symbols through which we seek to understand them, or to adjust our thought to them, as Mach puts it, is excellent evidence of Mach's soundness of method.[1] Indeed we might say a great deal more to justify Mach's philosophy considered as a working theory of scientific method. He has felt the needs of his science and has seen how to supply them.

Unfortunately there is still the other and the weaker side to consider. In performing its function as the Mentor of Science, Mach's philosophy commits itself to the following statement which we hold to be fundamentally vicious and misleading: 'There is nothing anywhere save sensations and the relations between them'. And yet this is the keynote of the whole position which an unfeeling critic—much to the author's amazement, who had hoped he was merely a physicist—stigmatised as sensationalistic, phenomenalistic, positivistic monism. We propose to focus our criticism on the one central aspect of sensationalistic monism.

In the first place we must note that Mach's reduction of the universe to a complex of sensations is effected in a most casual and threadbare manner. § 11 is a masterpiece from this point of view. There we find the intractable feelings, pleasure and pain, appropriated for the sensationalistic Theory on the sole ground that all sensations, as ordinarily understood, are able to pass gradually off into states of pleasure and pain; and all other feelings may, we read, be similarly appropriated, since every

[1] *Cf.* also the excellent remarks on p. 217, § 9.

feeling is essentially a pleasure or a pain. The will again is itself a complex of sensations of movement modified by recollected images, these images being themselves modified sensations. Finally, the elements of the outer world are only our sensations considered in their relation to one another, so that the whole inner and outer world is just a mass of sensations and nothing more.

But not only is the reduction most insufficient and unconvincing, it seems at first sight quite unnecessary. Mach repeatedly tells us that the sole thing Science can do is to investigate the laws according to which elements are related to each other, and that only metaphysicians with plenty of leisure will ever think of inquiring into the actual nature of these elements. That nature is given. Why then this inquiry whereby the nature of volition and the nature of feeling is reduced without more ado to the nature of sensation? Is not the nature of pain given as pain and the nature of volitional effort as volitional effort? And cannot the relations subsisting between two volitions or two pleasures be analysed just as fruitfully when their own nature is left to them as when they are first disfigured into sensations?

The reason for this inconsistency is not easy to trace. It seems probable, however, that Mach felt instinctively that it was only in sensation that the physical and the psychical really do come into obvious contact, and that it is only on the supposition that all psychical qualities are fundamentally sensational that any physicist would allow that both he and the psychologist had the same subject-matter, though differently viewed by each.

With the qualitative differences in *sensations* Mach does not tamper. He allows a restricted number of these fundamental differences in quality (p. 15), and he is far indeed from aiming at reducing all sensations to more or less of one another so as to give the universe over to the mathematical physicist. Still it is hard to see why a volition or a pain should be more obviously reducible to sensational quality than the sensational varieties themselves to one fundamental sensation, say that of touch. In fact Mach's whole sensationalistic position is merely stated, it is not explained, or even clearly described. The only light he gives us as to what he means by a sensation is when he tells us that sensations are the elements of the universe considered in their relation to the elements of the individual's body, and not in their relation with one another.

But not only is there no attempt made to analyse the meaning of a sensation psychologically, but Mach has no Theory of Knowledge. On page 208 we read these words: 'Considerations turning on the Theory of Knowledge can indeed do no harm to any one, still . . . the physicist, for example, has no ground for allowing himself to be overmuch disturbed by such reflexions. Sharpness in observation and a happy instinct are very safe guides for him. His ideas, in so far as they prove inadequate, are best and

quickest set to rights by the facts themselves.' Mach rigidly follows his own advice. His first happy instinct is to entirely identify the subject of experience with the empirical self. Thus on page 17, in an insertion new to the second edition, he alludes to the common belief that an experience without a subject is unthinkable, and argues against the prejudice on the ground that the Consciousness of Self may have many grades and be constituted by the most haphazard medley of recollections; and he adds: 'The subject is built up out of sensations and then reacts upon them'. Our sensations then, according to Mach, are the thinkers: they fulfil the functions usually attributed to the Ego or subject.

This confusion between the Subject and the Self is so central a defect in non-metaphysical philosophies that it may be useful to consider it in some detail.

That Mach is right in denying any fixed line of separation between self and not-self cannot be doubted. The self may or may not include one's own body, dress, property. In a sense all that affects the interests of the self ceases in so doing to be a not-self to it. But the subject that makes the distinction between the self and the not-self is surely *quâ* subject, incapable of being an object at all.

A green leaf is not exhausted by being analysed out into its properties and relations. Its distinctively sensational character is not in any way explained by the process. We can experience the greenness of a green leaf but we can never know its greenness. So we can analyse a pleasure when once we have experienced it, but we can never know a pleasure, we can only feel it. So a volition must be willed before it can be known, and what is known of a volition is not the volition as it is experienced. So the experience of the self may be analysed once it is there, but even when analysed it can only be seized on its relational side, not as an experience of the subject but as the object of a thinking experience of the subject. The subject that experiences is therefore not the self as it is known in contradistinction to the not-self. On the other hand it is surely no metaphysical agency in the old atomic sense, still less a mere postulate. Why not call it 'the self experiencing,' and allow that the deepest conviction of what is meant by self must be gathered from this point of view. Mach would look upon this 'self experiencing' as an unknowable Thing in Itself. There seems to me to be a happy vein of truth in this disparaging term. My knowledge of an experience of mine can never be a substitute for that experience, for to experience is to enter into new relations and not to discover the meaning of relations already entered into.[1] The experience *quâ* experience is therefore unknowable, but it is not unknowable in the sense of lying outside experience but only in the same

[1] Except, of course, in so far as such discovery of meaning is entering into new relations.

sense that the blue sky I stare into is, *quâ* sensation, unknowable. It is mentally unfathomable. If Mach considers the Ego as subject to be a mere metaphysical bubble, so then are the sensations, and so, too, the world which is built up out of them.

And indeed we find Mach adopting some such view as the above when he comes to speak of sensations in themselves. These are his words: ' . . . All forms, colours, etc., are in themselves one and the same (*gleichartig*), in themselves they are neither psychical nor physical'. The meaning ascribed above to '*gleichartig*' is gathered from another expression in the same section, when he says that the elements 'are always the same (*dieselben*), and of one kind only (*nur von einerlei Art*), presenting themselves now as physical elements, now as psychical elements, according to the kind of connexion in which they appear' (§ 3, p. 46). These elements in themselves, which are neither physical nor psychical, must surely be the sensational experience itself *quâ* sensational experience, an experience which admits as little of a psychological explanation as it does of a physical explanation.

Mach's sensationalism then, in so far as it is metarelational, is a tacit recognition of the rights of metaphysics, and above all of the necessity of a searching Theory of Knowledge. A *Nachbemerkung* to this effect would have been very welcome. Still a reviewer's last word on this excellent book must be one of gratitude and appreciation. There is no reason whatsoever, on the appearance of this second edition, for modifying in any way Prof. Stumpf's verdict when in his notice of the first edition, fourteen years ago, he described it as highly original, stimulating and instructive; or indeed that of Prof. James, who referred to it as a work of genius. Perhaps however it would be truer to call it the work of a genius.

W. R. Boyce Gibson.

VI.—NEW BOOKS.

An Essay on Personality as a Philosophic Principle. By the Rev. Wilfrid Richmond, M.A. London: Edward Arnold, 1900. Pp. xix., 219.

This is a delightfully written book. The author has realised the intention, with which we may doubtless credit him, of presenting to the general educated public an attractive and readable treatment of a philosophic theme. Mr. Richmond disclaims any purpose of establishing a philosophic conclusion, his concern being rather with the illustration of a certain aspect of experience as a leading philosophic principle. His object, he tells us, is "to present a certain aspect of experience in such a way as to secure that it may be entertained as a philosophical principle, a principle to be hereafter justified and established". This purpose he carries out by showing how the principle which he calls "Personality," can be developed for the interpretation of experience. "Experience is the beginning and the end of philosophy." To define it completely is the end; but the end will be missed if any essential element of experience be disregarded at the beginning, *i.e.*, if at the beginning we mean by experience less than experience is. "What, then, is the experience which gives the utmost meaning to experience, the reality which is pre-eminently real? We may answer in a word—personality." The next step is to settle the meaning of that word. Through an interesting discussion of its use in the history of language, the author leads up to the conclusion "that the word 'personal' is only rightly applied to any feeling of the individual when the feeling is a consciousness of relation to another person," and thence, somewhat steeply, to the suggestion "that personality in the individual is the capacity for society, fellowship, communion". Having thus, apparently, taken the position by assault, and defined his opposition to "modern philosophical literature" in which "personality is assumed to be essentially individual, essentially limited," Mr. Richmond proceeds to defend his definition with an ability which makes one regret that he did not turn his argument to more convincing effect by establishing the principle of fellowship at the end instead of stating it at the beginning of chapter iii.—by dialectical development of the current view rather than by direct contradiction of it. Our author does not deny individuality as a fact of experience, and, therefore, we may assume that he allows it to stand as a philosophic principle. All his clearly conceived and excellently phrased arguments in illustration of his definition might be equally well directed to show that individuality *for its development* requires communion with its world—the Self with the Not Self—through the whole gamut of volition, intellect and emotion. Thus the individual self, in the very concentration of his selfness as a centre of energy seeking development, is also a centre of action passing outside his limits continually, to use, to understand, and to serve the collective life, perfect unity with which must be conceived as the ultimate

limit of self-development for each self and all selves concurrently. The principle of fellowship, understood of course in the widest sense, including all things both great and small, could in this way be shown to be *the principle of the development of individuality*. Self-development and self-surrender, in the full understanding of the meaning of each, appear thus as opposite sides of the shield.

Now Mr. Richmond's proposal as to the use of the word "personality," taken with his argument for it, amounts to distinguishing the personality of the self as a capacity for fellowship from its sheer individuality. Altogether contrast not connexion seems to be their relation in his view. The other way would be to discover this capacity for fellowship as implied in the capacity for individual development. Of course the emphasis on "fellowship" is apt to suggest rather too exclusively communion with our peers, *i.e.*, human society, and our author, though he admits, does certainly somewhat ignore, the non-human element in that communing with the external world which is our life. This, however, is a minor point of criticism, affecting the line of illustration chosen and not the principle. The real point at issue is whether it is allowable to use such a word as "personality" with such a host of question-begging possibilities in a sense which omits one-half of its ordinary contemporary meaning. Taking account of all its associations, past and present, the word suggests the insidedness of the individual self, even more forcibly than his outsidedness in converse with others; though it is true that in speaking of a person as having "personality" we seem to lay stress on his capacity for expressing his individuality in relation to others rather than on his socially quiescent individuality *per se*. If all this be so, a definition to the following effect may be suggested. Personality means: Individuality expressing itself, in apprehending its world and adapting itself to its world, feeling, knowing, using, serving, loving it.

The onesidedness of his definition does not prevent Mr. Richmond from developing in a most interesting and instructive manner the truth that personal experience, even in the above concrete sense of the word, is in all its details essentially a converse with others—things and persons. In this converse we find alike (1) our first notion of reality as "that which is other than ourselves and only as other than ourselves enables us to identify ourselves with it," (2) our test of reality in "the experience of the ordinary man" as "part and parcel of the experience of mankind," and (3) our crowning conception of "the ultimate reality of the Universe of Knowledge and Existence" as "itself the inspiration and the source of the communion of knowledge which actually subsists between mind and mind when man knows his fellow-man." He traces the action of this principle of communion through the whole range of life, volitional and emotional as well as intellectual. It would not be fair to this excellent analysis to attempt a brief summary of it. Let it suffice to indicate its social tendency in reference to the sphere of emotion. "Every individual carries with him, as part of himself, the consciousness of a collective mind in the society to which he belongs." Then having specified some of the ways in which this shows itself, he goes on to say: "These are but vague and fragmentary indications of the most deep-seated principle of personal life, that which makes sympathy in some degree the need of all men and self-devotion the one commanding need of the best." And again, in treating of the religious emotion, having shown how the supreme satisfaction of conscience and intellect become elements in it, he goes on to characterise it finally thus: "This is the supreme example of emotion as the delight in self-surrender; it is the emotion in which we dwell upon this delight in self-surrender itself as

the life in us of the Spirit of self-surrender, giving Himself to us by giving it to us, as an endowment of our nature, to give ourselves to Him."

Suggestive and stimulating as are all these chapters in the second part—the bulk—of the book, it does seem that the attenuated definition of the principle of personality at the start detracts from, though it does not destroy, the concrete fulness of the interpretation of experience by it. But it may be that we strike here on a real difference of opinion as to a fact of intuition. Mr. Richmond, perhaps, would not admit that the pure insidedness of a person, and even the mere principle of insidedness, as opposed to the outsidedness of personality in his sense, plays the large part in the development of experience, collective no less than individual, which some would assign to it. The human need for solitude as supplementary to society, and hardly less essential, has left its mark on the history of mankind. It is noteworthy, too, that the more sociable a person is with his fellows, the more disposed is he to enjoy tracts of solitude: certainly it is not the most sociable races that are the most continuously gregarious. Probably the capacities and therefore the desires for self-communing and for fellowship rise and fall together in proportion to the vigour of the personality in which they occur. It is certain that life becomes as much dwarfed to those who live more as to those who live less than a certain amount in the presence of their fellows. Non-human nature claims our attention, and claims it undivided and self-reliant. We claim it no less for ourselves to be alone with the thickly springing train of our thoughts and schemes and fancies. It is not only that we are interested in the particular self which may be conceived as the summary of our personal evolution historically consisting in a certain perspective as well as limitations. Our more wholesome concern is rather with the activity in itself of the universal self in us which, though it refers to the collective consciousness as the warrant of reality in its own experiences, and knows itself as a part in that whole, at the same time aspires to be its own judge and to make the whole its own. This individualism of the individual self, based deep on a sense of allness in each, is apt to be lost sight of and perhaps starved by too much insistence or collectivism. Yet it seems difficult to doubt that the progress of the race has depended as much on the self-assertion of the individual in the higher as on his self-denial in the lower sense.

Nevertheless the fact remains that Mr. Richmond has given us an essay on fellowship as the principle of development in experience which well repays perusal and is remarkably pleasant to read.

SOPHIE BRYANT.

From Comte to Benjamin Kidd: the Appeal to Biology or Evolution for Human Guidance. By ROBERT MACKINTOSH, B.D. Edin., M.A., B.D. Glas., Professor at Lancashire Independent College. London: Macmillan & Co.; New York: The Macmillan Company, 1899. Pp. xxii., 287.

The object of Dr. Mackintosh's book is to examine the claims of Sociology (as conceived by Comte and his successors) to determine the principles of human conduct; and, inasmuch as the distinctive feature of the science, "or the alleged science," of sociology consists in its connexion with biology, the argument is in substance, as the sub-title suggests, an examination of "the appeal to Biology and Evolution for human guidance". For this purpose Dr. Mackintosh subjects to a critical

scrutiny the doctrines of Comte, Spencer and Stephen, Bagehot and Ritchie, Alexander, Huxley, Drummond, Sutherland and Kidd. There are also chapters upon the "Metaphysics of Natural Selection," and upon Weismann's theories. Dr. Mackintosh has not much difficulty in showing that biological moralists speak with many and conflicting voices, and that much that passes for scientific ethics is metaphor and uncritical analogy. The substance of his criticism is contained in the following summary: "The one attempt to give authority to biology as a guide for human conduct is the doctrine of evolution. The only accredited theory of naturalistic evolution is natural selection. And it does not, it cannot, apply where reason is at work." He is therefore altogether out of sympathy with the efforts that Prof. Ritchie, for instance, has made to reconcile idealism with evolutionary ethics. Are we to conclude that evolution does not in any sense apply to moral ideas? That moral ideas are the result of development is a position accepted by idealists and naturalists alike, and it is implicitly (in not too many passages) recognised by Dr. Mackintosh. But he has not himself attempted to account for the evolution of morality; he scarcely suggests that there is any problem at all. It is, in fact, very difficult to extract a constructive theory of ethics out of Dr. Mackintosh's book; his criticisms of evolutionary ethics are sufficiently shrewd and to the point: but the impression left on the reader is not merely that the application of the idea of development to ethical conceptions has been badly done, but that it does not need to be done, or even does not admit of being done. As Dr. Mackintosh himself says, "all is not done when we recognise the importance of reason and will. We are not at the end of social philosophy. We are only at the beginning of a better start." He goes on to say (much in the same way as he has already criticised the dualism of Huxley's lecture on "Evolution and Ethics") that "reason is the fulfilment" (as well as the transformation) "of nature"; but this is not in itself an answer to the problem which moralists like Profs. Ritchie and Alexander have in view. In short, Dr. Mackintosh's criticism is too wholesale to be thoroughly satisfactory: a little more discrimination and a little more inclination to recognise a problem to be solved, would have given greater weight to the criticism.

A fuller recognition of the elements of value in the conceptions of the social organism and natural selection as applied to ethics would also have helped the argument. All that Dr. Mackintosh says on this point is rather vague: the two suggestions that he credits to 'naturalistic' ethics are, that society is an organism, and that struggle is an indispensable element in human life; but he is inclined to reduce these truths to a form which really owes nothing to biology. Both truths, in one sense as old as moral and social speculation, have acquired an added significance from biological research, and the question is, Can any of this added significance be transferred to moral ideas? The uncritical use of biological analogies was bound to provoke a reaction, but may it not go too far? Dr. Mackintosh, like M. Tarde and Mr. Baldwin, goes the length of rejecting the analogy altogether: is not this to empty the child with the bath? Dr. Mackintosh is always effective when he is dealing with the pseudo-scientific conceptions that beset popular ethics, but Mr. Kidd's misuse of "the appeal to biology and evolution for human guidance" is not conclusive against the appeal itself: Dr. Mackintosh has not attempted to winnow the chaff from the grain.

Lastly, the criticism, as Dr. Mackintosh admits, is mainly destructive: the doctrines of evolutionary ethics are tried by tests of consistency and appropriateness, with the result, apparently, that natural science has not

given us any authoritative guidance, but has merely suggested "parables to the moral judgment". "These formal and logical tests pretty well clear the ground. A remainder of our theories, however, is overthrown (fourthly) by the final test, by the touchstone of the moral consciousness. Positively our argument can hardly be said to go beyond this point, that if biological clues are to afford guidance for human conduct, they must be supplemented by clearer moral and religious light, and in philosophy by some scheme of metaphysical evolutionism, marking a transition, perhaps, from Darwin to Hegel. Dr. Mackintosh's point of view —which he admits is an assumption needing a justification that can be given, "but not here"—is never made explicit: we are afforded no further revelation of moral authority than is contained in somewhat vague and uncertain references to 'conscience' and to ideal evolutionism. Dr. Mackintosh does not develop the rival philosophy of evolutionism on the ground of mutual incompatibility; but we are led to infer that "not very much in the way of dogmatic sociology" is to be expected from "the new social philosophy, if it follows these lines". "The general programme formulated by wise teachers will be notably vague. That will not matter greatly. The wise social philosopher will not claim that the one fount of wisdom for men or societies is the fountain which he has enclosed. Ethics proper will be among his data. He will renounce as fraudulent and absurd the attempt to deduce ethics from schemes of physical or even of biological evolution." It is certainly one great lesson of evolution that no statements as to the details of morality can be final: duties change, but not duty. On what are we to fall back for practical guidance? Apparently on 'conscience,' as informed by the Christian religion. But till the authoritativeness and sufficiency of this guide is established, it remains a 'prejudice,' and Dr. Mackintosh should either have made his point of view valid, or kept it severely out of the argument. Taken as a whole, therefore, Dr. Mackintosh's argument cannot be regarded as altogether satisfactory or decisive: on the other hand, it is full of acute and alert criticism. The style is, perhaps, more suited to a lecture-room than to a philosophical treatise, It is animated, but it is also rather jerky; and at times the points are a little rough and random: "Can Science, as applied to physical nature, really guarantee the world against moral paralysis?" is, for instance, a more rhetorical than relevant question. Expressions like 'Darwinise,' 'biologise,' and the like are rather too frequent: and there is a clerical error on page 90. It should be observed that Dr. Mackintosh's book is the outcome of lectures given to a class in Sociology at Lancashire College. Shortcomings of arguments or style are no doubt largely due to this circumstance. The lectures were well worth a larger audience, and have made a book that is well worth reading, more especially by those who have accepted Mr. Kidd's *Social Evolution* as a new and authoritative revelation.

SIDNEY BALL.

Knowledge, Belief and Certitude. By FREDERICK STORRS TURNER, B.A. Lond. Pp. viii., 479.

This book is to some extent recommended, and to some extent marred, by being the work, apparently, not of a trained student of philosophy but of one who turns to philosophy for the answer to a special question. The author is singularly free from partisanship, but on the other hand he often, for the mere pleasure of the thing, gives us brief accounts and criticisms of previous philosophers, which contain nothing particularly

new and do not perceptibly further his argument; a more disciplined delight in philosophising would have produced a better book. All credit is due to the author's intellectual honesty and carefulness; but the conclusions do not seem to mark any advance on previous speculations, and the inquiry is too often vitiated by a recurrence to the position of common sense in face of metaphysical difficulties.

Mr. Turner begins his inquiry free from every prejudice or assumption save this, that 'we have some certain knowledge which we believe to be true'. Knowledge is provisionally distinguished from belief as the independent from the dependent, the intuitive from the inferential; but the main thesis of the book is that our supposed knowledge turns out on examination to be no better than belief. Knowledge, we are told, rests on three given certitudes—the self, other selves, and a real world. These certitudes are distinguished from knowledge by the fact that they are not the result of thinking and reasoning: thus knowledge rests on something outside itself, and is, therefore, not independent. But the distinction of these certitudes from knowledge is very questionable, and Mr. Turner's conclusion, so far as it rests on this basis, seems unjustified. He proceeds to examine in detail the knowledge contained in science, psychology and philosophy. He points out with some force the inadequacy of certain distinctions which have been drawn between science and unscientific knowledge, and concludes that it is safer to speak of sciences than of science. He shows the difficulty of assigning to logic and ethics their place in the scheme of the sciences, while he refuses to class psychology as a science at all, and calls it a study preliminary to philosophy. Two of Mr. Turner's criticisms in this part of the book are of some importance. He criticises Dr. Shadworth Hodgson's psychological analysis as unreal, objecting particularly to the withdrawal of the idea of self from the analysandum; and on similar grounds he criticises Wundt's conception of a universal experience, in which I am not distinguished from you, nor subject from object.

From the inadequacy of science to account for its first principles, such as matter and force, and from the fact that men have never yet come to an agreement on even the most fundamental questions of psychology, Mr. Turner concludes that abstract knowledge is never absolute. In language which places him alongside of such writers as Lotze and Prof. Münsterberg, but which verges even more closely on a merely empirical view of knowledge, he declares in favour of 'real knowledge,' in which the object is no longer viewed in abstraction from the subject and from other objects —the knowledge which is embodied in action, and expresses itself in morality, art, religion, and philosophy, rather than in science. This is an important conclusion, and is fairly well supported by Mr. Turner, though not proved with complete cogency. One cannot but feel it to be an anticlimax when the author states, as his final conclusion, that knowledge is belief. The definition of knowledge as 'belief in the infinite Reality' does not take us much further, for Mr. Turner will not commit himself as to the nature of this Reality. His final conclusion is only a confession, which few would care to dispute, of the non-absoluteness of our knowledge.

W. D. Ross.

Imitation in Education: Its Nature, Scope and Significance. By J. N. Deahl, A.M. The Macmillan Co., 1900. Pp. 103.

We are sorry we cannot speak in high terms of this number of the "Columbia University Contributions to Philosophy, Psychology and

Education". The author means well, and with the conclusion he would enforce we are in general agreement. That conclusion is stated at the end of the book, and the essence of it is in the words: "The imitative method of learning discloses the vanity and the inanity of requiring the child to invent and rediscover what the race has already invented or discovered". The "heuristic" method is, doubtless, by some of its advocates pushed to an extreme length, and so pushed, is based on a very inadequate analysis of the mental processes of the child. But whether it should be generally supplanted by "the imitative method" depends upon the sense in which "imitation" is used. And here Mr. Deahl leaves us in the dark. He begins by telling us that "this paper does not pretend to analyse psychologically the process by which one person influences the conduct of another," where it appears that "imitation" is very limited in scope. On page 93, however, and in other places, he apparently uses the term in the wide sense adopted by Prof. M. Baldwin, in which a repeated action is an imitation of a similar action already performed by the same individual. Elsewhere imitation is of material inanimate objects (*cf.* p. 29). Again, as all production is either imitative or original, and as "an absolutely original work must consist in something which can be likened to no other thing that existed previously," it would follow that everything man does must be imitative, and if this is the case there seems no reason for advocating an appeal to imitation.

Further, on page 9 we are told that there are two kinds of imitation—instinctive and intelligent, of which the former may be called imitation "only from the objective point of view". The only true imitation is subjective—*i.e.*, purposive and intentional. Of course this is not adhered to in the subsequent discussion. Moreover, in the *Questionnaires*, which apparently form the excuse for the book, we have stress laid on agreements found between III., which is entirely "subjective," and IV., which is essentially "objective" in its reference. Agreement between these as close as is shown on page 64 would tend to prove that unconscious imitation of their instructors by young people preparing to be teachers is practically non-existent. To those who know anything of the work of training teachers this is absurd. Indeed, the stating in percentages how much a teacher owes to imitation of various models strikes one as simply preposterous and worthless. We quite agree with the author that "none of the evidence in this paper, or all taken together, is thought to be sufficient to demonstrate anything" (p. 60). And so far as the evidence adduced is "probable," the probability is only in points which were commonplaces to Plato, and which these and similar inquiries show no signs of making more definite.

Mr. Deahl's general competence in literary matters may be gauged by the fact that he misspells Spenser's name each time he mentions it, whilst the following extract speaks for itself: "Mr. Edward Dowden saw two of the Literary Portraits of Sainte-Beuve side by side in a picture gallery" (p. 12).

J. Welton.

The Soul of a Christian: A Study in the Religious Experience. By Frank Granger. London: Methuen, 1900. Pp. ix., 303.

Prof. Granger has produced a very remarkable book which cannot receive in this journal all the notice it deserves, because its interest is much more religious than philosophical. Its object is to study the psychology of Christian religious experience. The titles of some of the chapters —"Ecstasy," "Visions and Voices," "Symbol and Ritual," "Prophecy

and Inspiration"—show the general nature of the topics that are treated. As a rule such matters have hitherto been dealt with by two opposite classes of persons—the mere sceptics and the merely devout. As an example of sceptical treatment Lombroso groups together St. Francis of Assisi, Luther and Savonarola as religious lunatics; while the literature of devotion is generally dominated by an undiscriminating reverence and the wish to edify. Prof. Granger has not only that spirit of devotion dashed with mysticism which is essential for full sympathy with his subject; he also possesses the philosophic training and disinterested curiosity of the true inquirer. Moreover, he is fortunate in having at his disposal the result of recent researches in hysteria and hypnotism. For want of this knowledge no earlier writer could possibly have understood the subject so as to separate genuine religious experience from the accidental pathologic phenomena which so often accompany it. The book has probably too great a leaning to mysticism to command general assent; but it is full of acute remarks and interesting psychological analyses; we may instance what is said about the psychology of religious persecution. Sometimes we think Prof. Granger is rather hard on the average man. If people lose their interest in the arts and poetry, "nothing remains but to tread the earth for the rest of their tale of years, phantoms in the guise of men". This sounds rather like preciosity. What about the working-man?

Psychological Studies. By H. Gale. No. i., July, 1900. Minneapolis, Minn.; published by the Author. Pp. v., 175. Price, $2.00.

A collection of six essays on psychological and physiological topics. The first paper deals with Our Nervous System and Its Uses, and is freely illustrated by microphotographs. A catalogue of lantern-slides for lecture use in the histology, physiology and psychology of the nervous system is appended to the volume; the slides can be purchased from the author. The second paper, on the Psychology of Advertising, concludes that "a plain statement in relevant words of the firm or name with the article, and in some permanent trade-mark form, is on the whole most effective for attention". The effect is increased by a relevant cut. "A simple statement of age and experience, with any genuine evidences of fair-dealing and of approval, seems the best means of supplying the buyer's desire for experience." The third paper gives the vocabularies of three children of one family, to two and a half years of age. The vocabulary of an average two-year-old child is 700 words; that of a child of two and a half, 1,400. A child uses 50 to 65 per cent. of its entire vocabulary on any one day. The fourth paper (by R. W. Tallman, with postscript by H. Gale) analyses the taste and smell elements of a number of ordinary articles of food. "The nitrogenous group of the proteids, the group of the fats, and the starch among the carbo-hydrates give us no taste; the dextrine and sugars of the carbo-hydrates give us the sensation of sweetness; the vegetable acids give us sour; and the mineral salts give us salt." 'A Case of Alleged Loss of Personal Identity' has already been printed in abstract in the *Proc. S. P. R.;* and 'Psychical Research in American Universities' has also appeared in part in the same journal. Interesting is the author's confession in the Preface: "A chance copy of the *Proceedings of the Society for Psychical Research* aroused a real interest during my Sophomore year in College, when we had no intellectual interests except shielding ourselves from the disciplinary pricks". Something must have been seriously wrong either with Sophomore or with College!

An Enquiry Concerning Human Understanding. By DAVID HUME. Chicago: The Open Court Publ. Co., 1900. Pp. xxviii., 180. Price, 25 c.; 1s. 6d.

Eros and Psyche, a Fairy Tale of Ancient Greece. Retold after Apuleius. By P. CARUS. Chicago: The Open Court Publ. Co., 1900. Pp. xvii., 99. Price, $1.50; 7s. 6d.

Whence and Whither. An Enquiry into the Nature of the Soul, Its Origin and Its Destiny. By. P. CARUS. Chicago: The Open Court Publ. Co., 1900. Pp. viii., 188. Price, 28 c.; 1s. 6d.

The *Enquiry* is a reprint from the edition of 1777. The volume contains further Hume's autobiography, the letter from Adam Smith to Strahan, usually prefixed to the *History of England*, and a reproduction of the portrait by Ramsay. The book is of handy size and well printed; it should have a wide circulation.

Dr. Carus has prepared a readable translation of the *Eros and Psyche*. The volume, however, finds its justification rather in the reproductions of Paul Thumann's pictures than in the translation itself.

The three questions of the same author, *Whence and Whither*, are answered as follows. The nature of the soul is the soul's being as a system of sentient symbols. As to its *Whence*, "we are the continuation of the soul-life under whose parentage and general care we have taken our start, and represent the sum total of the endeavours of our ancestry since times immemorial". Finally, when we have learned to recognise the intimate interconnexion of our selves with the life of the distant past as well as with the life of the ages to come, we "breathe the air of immortality. Our souls have risen into the domain of the superindividual life; . . . deity has become incarnate."

New Psychology. By J. P. GORDY. Seventh Edition. New York: Hinds & Noble, 1900. Pp. x., 402. Price, $1.25.

Prof. Gordy's book has nothing to do with the 'new psychology,' technically so-called, but is rather (as the publishers put it) a series of "familiar talks to teachers and parents on the successful teaching and rearing of the young". It is written in a chatty and topical way, appealing as occasion arises to physiology, psychology, logic, metaphysics and the history and theory of education. There are forty-two 'Lessons,' each with its appropriate set of Questions. The work is, perhaps, as good an introduction to serious study for teachers and child-psychologists as we have; its merit is attested by the fact that it has run into seven editions since 1898.

The Divine Pedigree of Man; or, the Testimony of Evolution and Psychology to the Fatherhood of God. By. T. J. HUDSON. London: G. P. Putnam's Sons, 1900. Pp. 379.

This book is a queer compound of psychology, biology, philosophy of religion and hypnotic science. It is written with boundless self-confidence and unsparing contempt for the agnostics and atheists who have the misfortune to differ from the writer. The fundamental proposition of the work is psychological, that man is gifted with two minds; one objective; the other, subjective. The chief endowment of the former is inductive reasoning, while the latter has deductive reasoning and most of the other psychic faculties, but has the remarkable limitation of being

controlled by hypnotic suggestion. It is only fair to Mr. Hudson to say that whatever philosophic faults may be alleged against him, want of coherence is not one of them. His whole system stands very neatly upon his fundamental proposition. But this makes it unnecessary to criticise the details of the system. For nothing will induce us to accept his summary bisection of the human mind.

L'Imagination et les mathématiques selon Descartes. Par P. Boutroux, licencié ès lettres. Bibliothèque de la Faculté des Lettres de l'Université de Paris, No. x. Paris: Alcan, 1900. Pp. 45.

This volume contains a careful exposition of Descartes' doctrine on the subject dealt with, but abstains from all criticisms; the many objections to the doctrine are not mentioned, and some, at least, seem not to be perceived. The difficult questions as to the Cartesian meaning of imagination are left untouched. The work has as motto a quotation from the *Regulæ* to the effect that the intellect alone can perceive truth, but that it is well to assist it by means of imagination, senses and memory. This thesis is amplified in the text. Descartes aimed at restricting the use of imagination in mathematics, but regarded it, nevertheless, as in some degree an indispensable auxiliary. M. Boutroux divides his discussion into two parts, the first on the principles of mathematical knowledge, the second on mathematical demonstration. In the first part, it is pointed out that, though knowledge requires ideas, not images, yet imagination is useful, not only in Geometry, but also in Algebra, from which Descartes excluded every notion not capable of representation by an image. In the second part, it is pointed out, to begin with, that Descartes asserts not only that the triangle can be conceived, but also that its properties can be proved, without the help of imagination or the senses (p. 13). But demonstration, being regarded as a practical method of arriving at new truths, may be pursued by whatever method is most convenient, and practically it is easier to employ the imagination to some extent. M. Boutroux proceeds to remark (p. 15) that imagination always intervenes in deduction, since this operation takes time. This view seems irreconcilable with the previous view as to the demonstrability by the pure understanding of the properties of the triangle. It seems also scarcely possible to hold, as he does, that imagination is essentially to be distinguished from the understanding by the fact that the former, but not the latter, acts in time. For the imagination is a part of the body, situated in the brain (*Regulæ*, xii.), which is surely part of its essential difference from the understanding. M. Boutroux points out that Algebra, for Descartes, has to borrow its definitions and axioms from Geometry, and in this way makes use of imagination; and that the practical utility of symbols depends upon their being imaginable. Descartes' universal mathematics is regarded as a youthful dream, which he afterwards abandoned. Demonstration, we are told, is not properly an affair of the understanding, for, from the point of view of the understanding, one proposition does not precede another or give its reason. This view, by the way, though probably Cartesian, is certainly false. The volume ends with two appendices, one on Vieta, pointing out that he was more dependent on imagination than Descartes, the other on the differences between the *Regulæ* and later works.

Though many of Descartes' remarks on mathematics are excellent, his theory of the imagination appears thoroughly erroneous—so much so as to possess nothing but a historical interest. But such as it is, the theory has been clearly, and, I think, correctly, set forth by M. Boutroux.

B. Russell.

Essai sur l'Esthétique de Lotze. Par Amédée Matagrin. Paris: Ancienne Librairie Germier Baillière et Cie. Pp. 163.

M. Matagrin gives a short summary of the main æsthetic positions of Lotze, treating as the basis of his work the posthumous *Grundzüge der Aesthetik*, and comparing this with the *Geschichte der Aesthetik in Deutschland*, though he also refers frequently to the *Mikrokosmos*. The author traces a marked development of Lotze's thought between his earliest and latest work on this subject, and especially a great modification of the almost pure idealism of the *History*. In fact the most interesting part of the essay is that which deals with Lotze's relation in æsthetics to previous thinkers, particularly Kant and Hegel, and which points out how he, to a great extent, combined the metaphysical doctrines of the idealists, as to abstract beauty, with the psychological theory of play, and with a modified form of Kant's *Kritik of Judgment*, which last is, indeed, the main influence to be discerned in him.

M. Matagrin distinguishes Lotze from the idealists chiefly by his admission of an æsthetic character in sensation as such; from Kant by his recognition of the difficulty in distinguishing the judgment of the beautiful from that of the agreeable by its universality; from the psychologists by his refusal to abstain from the quest of an objective ground for our subjective æsthetic pleasure. It seems, perhaps, a pity that of the hundred and sixty-three pages only seventy-two are devoted to Lotze's metaphysic of the beautiful, and the remainder, after a few paragraphs on the origin and growth of art, to a classification of the different arts. The author confesses that it is in the criticism, or rather classification, of Lotze that he finds most value. "Nous regrettons," he says, "que la doctrine de Lotze repose sur un principe purement métaphysique" (p. 155). But this system seems both by its originality and its relation to those of other great æstheticians more interesting that the somewhat sterile distinctions so fully reproduced in the greater part of the essay, which do not in outline differ from the similar work of Hegel or of Michelet, though they contain many isolated phrases of great brilliance, as when the essence of Lyric Poetry is described as the Objectification of what is subjectively felt. It may, perhaps, be questioned whether M. Matagrin does not confine the meaning of Lotze's *Werth*, which all art symbolises, much too narrowly to purely moral worth (p. 33; *cf. Grundzüge*, 13).

Le Rire, essai sur la signification du comique. Par H. Bergson. Paris: Félix Alcan.

M. Bergson deals with the nature and expression of τὸ γελοῖον. A subject at once so easy of attack and difficult of mastery generally produces writers of the *a priori* type and unwarrantably dogmatic, either men with a theory, or such as have never realised the complexity of their theme. M. Bergson is neither. His method is scholarly and tentative: a careful arrangement and classification of data prepares the way for some cautious generalisations.

He suggests, partly on the lines of Aristotle, three characteristics of the ludicrous, *viz.*, (1) the human, (2) the unemotional, (3) the social element. But it may be doubted whether these qualities mean much as they stand. They hardly point to anything essential. Nothing can be entirely stripped either of its human or of its social reference: each becomes only a matter of degree. And as to the suggested absence of emotion, we have to consider the manner in which the extremes of

pathos and humour tend to converge, as exemplified by the phenomenon of hysteria, or the utterances of Shakespeare's John of Gaunt and Richard II. in the play of that name. M. Bergson would perhaps regard these manifestations in the light of ordinary physical reactions, constituting as such no explanation of mental processes. And that is really the crux of the problem—the extent and importance of each member in the psycho-physical correlation, to which nevertheless M. Bergson has not addressed himself.

Apart from this lack of finality about the work, the reader is struck by many fruitful observations. The very obvious but often ignored relativity of laughter, alike to the environment and the individual, its inverse ratio to the self-consciousness of the subject, and above all, its connexion with the perpetual struggle between the automatism and the difference of life—these facts are insisted on and admirably illustrated. And in spite of some apparent inconsistencies, as when, for example, M. Bergson tells us that to laugh is to be an indifferent spectator, and at the same time to be the member of a group, one cannot but feel that the author has done full justice to an intricate subject. Our only regret is that with such a command of facts, and such philosophic insight, M. Bergson has not gone deeper into fundamentals.

Schopenhauer, Hamlet, Mephistopheles. Von Friedrich Paulsen. Berlin: Hertz; London: Williams and Norgate, 1900. Pp. ix., 259.

These three charming 'essays in the natural history of pessimism' originally appeared in the *Deutsche Rundschau* between the years 1882 and 1899, and all who read them then will be glad that they have now been collected and rendered accessible in a convenient form. They are popular in the best sense of the term, *i.e.*, brightly and lucidly written and artistically composed; but their popularity never leads the reader to forget that they are the work of a master both of philosophy and of literary craft. At first sight the juxtaposition of the real career of Schopenhauer with interpretations of ideal personages of Shakespeare and Goethe seems a little surprising: but the explanation is that Prof. Paulsen finds that a common defect and a similar endowment is exhibited by them all and results in a very similar attitude towards life. All three are devoid of love; all three are intellectually gifted, and all three use their intellect to deride bitterly the value of life. In Schopenhauer's case the justice of this estimate can hardly be disputed; in that of Hamlet and Mephistopheles even those least disposed to agree with Prof. Paulsen's conception of their character will hardly deny its ingenuity and suggestiveness. Prof. Paulsen's clue to the interpretation of Hamlet is the character of Frederick the Great as Crown Prince, before his succession to the throne and the demands of practical politics had forced the satirical dilettante of Sanssouci to become a military hero. In spite of its novelty this interpretation is carried through with a considerable measure of success and it is hardly a serious objection to it that it involves, incidentally, the lowering of Ophelia to the plane of Faust's Gretchen. Prof. Paulsen's conception of Mephistopheles, on the other hand, diverges less from the conventional. The key to his character is commonness: it is this which he essentially is, which he sees and produces in others: his constant aim is to lower everything lofty and noble to his own level by unceasing mockery. This conception of the character of Mephistopheles seems to underestimate the traces of his fallen greatness while overestimating his seriousness; it is difficult to suppose that Mephistopheles was seriously labouring to effect the

damnation of Faust by the grotesque methods of mediæval superstition, while at the same time perfectly conscious that, in common with all the powers of evil, he was being used as an instrument in the moral redemption of a world whose value he utterly denied. But after all in the case of such creations of the poetic imagination every one may claim the right of constructing the Hamlet or the Mephistopheles that he fancies; nor will any one deny that the Hamlet and the Mephistopheles of Dr. Paulsen are interesting fellows and good to read about.

F. C. S. SCHILLER.

Della Necessità nel Fatto Naturale ed Umano. Da GIUSEPPE TAROZZI. Torino: Volume primo, 1896. Pp. xxviii., 289. Volume secondo, 1897. Pp. xvi., 354.

Ricerche intorno ai Fondamenti della Certezza Razionale. Da GIUSEPPE TAROZZI. Torino, 1899. Pp. viii., 272.

Prof. Tarozzi is a positivist. But he differs from most if not all other members of the school by denying the doctrine of determinism. And, like Epicurus, he denies it in the most thoroughgoing fashion, refusing to recognise necessary sequences in physics no less than in morals; or, to use his favourite expression, in the facts of nature no less than in the facts of humanity. According to him, determinism in any form is but a survival of the belief in a divine government of the world which positivists, under the guidance of modern science, profess to discard; and to prove this he has written a history of the doctrine in which teleology and necessity are represented as constantly going hand in hand. It need hardly be said that the attempt is a total failure. If Prof. Tarozzi had written the history of the doctrine of free-will concurrently with the history of determinism—which for other reasons would have been desirable—he must have observed that the supporters of that doctrine are almost invariably, from Aristotle to Dr. Martineau, believers in final causes. As a history too, and apart from its dogmatic tendency, the work errs both by excess and defect. Far too much space is given to German philosophy, which in this instance has had very little influence on contemporary thought; while the English thinkers from whom modern determinism is almost solely derived receive only the very scantiest recognition. The influence of physical science in establishing the notion of invariable sequences is, with the exception of some wholly irrelevant references to Galileo as an authority on the other side, ignored. Curiously enough, Prof. Tarozzi himself when he is tracing the courses of thought always treats his subject from a rigidly deterministic point of view. To read him one would suppose that philosophers up to the present day had their opinions dictated to them by the theological traditions of the Middle Ages. Nay, his very hatred of determinism has, like that of a good many other people, a deterministic motive—belief in its mischievous effect on conduct. For this his principal authority seems to be M. Paul Bourget's novel, *Le Disciple*. If the will is really free it seems odd that a particular philosophical opinion should act on it as such an effectual "clutch". Again Prof. Tarozzi comes out as a good teleologist when he speaks of free-will as the instrumentality by which human beings advance to complete disinterestedness. Why should not liberty of choice make for perfect selfishness?

In his work on the "Foundations of Certainty," Prof. Tarozzi, while continuing his polemic against determinism, endeavours to find a psychological basis for the first principles of formal logic—Identity, Contradiction, Excluded Middle, and the Law of Sufficient Reason. It would

appear that he interprets these as so many artificial lines drawn across a continuous, but ever-varying stream of consciousness. But the author's mode of exposition is so repellent that of all "rational certainties" certainty as to his meaning is the least attainable. The present reviewer has sometimes turned from his pages for rest and recreation to Hegel's big Logic.

A. W. B.

L'Esiglio di San Agostino. Da Lorenzo Michelangelo Billia. Torino, 1899. Pp. xi., 148.

The "exile of St. Augustine" is a figurative expression for what Prof. Billia considers to be the expulsion of spiritualism from the official teaching of philosophy in the Roman Catholic Church. The revival of Thomism by order of Leo XIII. has evidently not had the effect of restoring unity of thought within the limits of his ecclesiastical jurisdiction, but rather that of reviving the mediæval conflict between Aristotelianism and Platonism. The author takes as his text a book on the spirituality of the soul by M. de Craene, the Neo-Thomist professor at Liége, and subjects it to a somewhat diffuse and desultory criticism It is rather surprising to hear that the chief notes of Neo-Thomism are hatred of spiritualism and an affectation of excessive modernity. The great oracle of Prof. de Craene is it seems—Taine. Evidently the extinguishers are taking fire; and the particular points raised by Prof. Billia are of trifling interest compared with his involuntary testimony to the revival of philosophic liberty in an unexpected quarter.

A. W. B.

Il Concetto dell' Anima nella Psicologia Contemporanea. Da Francesco de Sarlo. Firenze, 1900. Pp. 45.

This is the inaugural lecture delivered last March by the new professor of philosophy in the Studi Superiori of Florence. Prof. de Sarlo is a spiritualist; that is, he maintains the substantial reality of the soul as the unifying principle of consciousness, the abiding centre and source of all its manifestations. So much, he contends, is demonstrated by experience; but he does not, so far, claim scientific validity for any conclusions going beyond experience, such as the eternity or immortality of the soul. Within the limits of a single address the author has naturally not room enough for the full development of his thesis nor for its adequate defence against hostile criticism; and his methods are occasionally of a somewhat summary character. In particular, it may be noted that the exposition of Prof. William James's theory of personal identity, and the refutation of it are so hurried as to be barely intelligible.

A. W. B.

Received also:—

J. Jastrow, *Fact and Fable in Psychology*, Boston, Houghton & Mifflin, 1900, pp. xvii., 370.

A. T. Ormond, *Foundations of Knowledge*, London, Macmillan, 1900, pp. xxvii., 528.

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VII.—PHILOSOPHICAL PERIODICALS.

Philosophical Review. Vol. ix. No. 5. **J. Dewey.** 'Some Stages of Logical Thought.' ["Thought is to be interpreted as a doubt-inquiry function, conducted for the purpose of arriving at that mental equilibrium known as assurance or knowledge." It has four historical stages. (*a*) The period of fixed ideas: ideas, expressing established social attitudes or customs, are taken as unquestionable, and applied to cases which are equally fixed. *Cf.* the rules of primitive communities. (*b*) The period of discussion: ideas are agitated, brought together, their rigidity broken up. *Cf.* the Sophists. (*c*) The period of reasoning or proof. Interest centres in standards of decision (Socrates) and in the technique of their use (Aristotle). Inquiry is bounded on the one side by fixed, ultimate truths, and on the other by the generally suspicious region of 'matter of fact'. (*d*) The period of inference: of inductive and empirical science. "It is inquiry emancipated, universalised, whose sole aim and criterion is discovery." Need of reform in logical statement, whether empirical or transcendental.] **M. W. Calkins.** 'Psychology as Science of Selves.' [There are two psychologies: 'atomistic' psychology, treating of the contents of consciousness as such; and 'self' psychology, treating of conscious selves, first, as they refer to things and feelings or to other selves, and, secondly, as they refer to different kinds of self, myself or my fellow, in different relations. This second psychology is Münsterberg's 'history'. Illustrations of possibility of double treatment (perception, emotion, will, faith). Classification of topics handled by a science of selves. This is the simplest introduction, whether to ethics, social science, or philosophy; though, as a psychology, it is distinct from all.] **A. E. Davies.** 'The Concept of Change.' [(*a*) Logical. "In a logical treatment of the concept of change, we are not limited to a criticism of scientific processes and conclusions; we must advance to a consideration of the principle contained in, and on which reposes, the logical use of the understanding. . . . The principle of sufficient reason . . . determines the conditions on which, from a logical point of view, change is possible." (*b*) Psychological. "Both content and form are conjoint factors in every mental experience, due to the fact that activity, working in and through both, manifests itself as a law of development, a principle of becoming". (*c*) Metaphysical. "The concept of change, as an epistemological postulate, has for its correlate in metaphysics a principle which seeks to embody the characteristics of the changes real being is known to undergo."] Reviews of Books. Summaries of Articles. Notices of New Books. Notes.

Psychological Review. Vol. vii. No. 5. 'Studies from the Psychological Laboratory of the University of California.'—I. **G. M. Stratton.** 'A New Determination of the Minimum Visible and Its Bearing on Localisation and Binocular Depth.' [A lateral difference of place of about 7 sec. of arc can be directly perceived. Stereoscopic

depth need not, therefore, be a 'subconscious' result of the spatial conflict of the two images. Theory of retinal localisation in terms of diffused intensity of stimulation over adjacent retinal elements.] **K. Dunlap.** 'The Effect of Imperceptible Shadows on the Judgment of Distance.' —II. [Seeks to determine whether the bisection of a horizontal line is influenced by casting on the line imperceptible shadows of the angles of the Müller-Lyer illusion. Two methods and three modes of evaluation bring out an affirmative answer. This experiment therefore falls into line (a thing which the author does not mention) with certain well-known experiments upon fusion and attention.] **R. Dodge.** 'Visual Perception during Eye Movement.' [Sources of error; clear perception of a complex field of vision during eye movement is impossible; the hypothesis of anæsthesia during eye movement is untenable; experiments with simple and complex fields, exposed only during eye movement. Simple fields are not seen, or seen as influenced by their background, according to circumstances. "A complex field of vision perceived during eye movement is seen fused." The general failure to see during movement is both centrally and peripherally conditioned; elimination of fatigue and prevention of error are teleological factors.] **E. Thorndike.** 'Mental Fatigue.'—I. [Arithmetical problems solved before and after work. Kraepelin has urged that we may be mentally fatigued without feeling fatigued. "What I wish to emphasise is that we can feel mentally fatigued without being so"; emotional repugnance to work is taken as indicative of mental fatigue.] **J. A. Bergström.** 'A Type of Pendulum Chronoscope and Attention Apparatus.' Discussion and Reports. **A. H. Pierce.** 'Professor Judd's Illusion of the Deflected Threads.' [*Cf.* the Review for May, 1898. Nothing more than the ordinary laws of tridimensional vision is in operation. Vision is not adjusting itself to novel conditions supplied by the experiment.] **E. F. Buchner.** 'Volition as a Scientific Datum.' ["Volition, as analysed, presents marks which entitle it to be placed among 'primitive' processes in consciousness. . . . It never stands alone, but is in constant relation from the beginning with all contents and all other functions of consciousness." The paper presents nothing new.] **J. McK. Cattell.** 'Vision with the Moving Eye.' Psychological Literature. New Books. Notes.

International Journal of Ethics. Vol. xi., No 1. **Gilbert Murray.** 'National Ideals: conscious and unconscious.' [A very brilliant and caustic article, the exact aim of which is uncertain. Men's unconscious ideals, not their conscious, are the real forces that govern them. The working of the former is illustrated by personal selfishness and English political history; of the latter, by zeal for reform and philanthropy.] **R. B. Carter.** 'Medical Ethics.' [On the duties of medical practitioners towards the public and towards colleagues, with an account of the disciplinary machinery existing in England to enforce them, and an estimate of the present influences acting upon professional morality.] **I. W. Morton.** 'Is Commercial Integrity Increasing?' [The writer answers in the affirmative from his experience as a business man in St. Louis, the main cause being improved organisation and intelligence.] **A. W. Benn.** 'The Relation of Ethics to Evolution.' [The relation is entirely negative. Whether we take a pessimistic or an optimistic view of the issue of evolution, the moral standard is not affected; nor does evolution influence our conception of the means of realising the moral standard.] **Eliza Ritchie.** 'Truth Seeking in Matters of Religion.' [We ought not to shrink from a candid examination of religious formulas, because those formulas have no value for action unless they satisfy reason.] **M. Adams.** 'The Ethics of Tolstoy and Nietzsche.' [Both

start from the individualistic pessimism and anti-rationalism of Schopenhauer. Tolstoy works out Schopenhauer's principles into boundless self-repression and self-sacrifice; Nietzsche into boundless self-assertion and expansion.] Book reviews.

L'Année Psychologique (Sixième année), 1900. **A. Binet.** 'Recherches sur la consommation du Pain, dans ses rapports avec le Travail intellectuel.' [An article of seventy-three pages, leading to the conclusion that very probably the intellectual labour involved in preparation for examination leads to a diminished consumption of bread. Not important perhaps to the psychologist, but possibly valuable as a practical hint for the schoolmaster.] **Ed. Claparède.** 'Revue générale sur l'Agnosie.' [A useful historical and critical review of the work of Finkelnburg, Munk, Wernicke, Bergson, Freund and others, on the subject of mental blindness, asymbolia, or agnosia; discusses its physical and psychical conditions, and points out its relations to apraxia, aphasia, etc. Kinæsthetic sensations perhaps play a more important part in the work of recognition of objects than is generally believed: the use of language may mask to some extent defects in direct perceptual association. The paper is followed by a full bibliography.] **J. Larguier des Bancels.** 'Les Méthodes de l'Esthétique Expérimentale.' [A historical and critical review of the experimental methods of Fechner, Witmer, Cohn, Major and Pierce; although insisting on the importance of the experimental methods pursued by these psychologists the writer admits that laboratory researches cover only a small part of the whole field of experimental æsthetics.] **Th. Simon.** 'Recherches anthropométriques sur 223 Garçons anormaux.' [In a long article, full of figures, we have the results of a series of measurements of idiotic and imbecile lads, tending to show that a well-developed body and a well-developed mind are usually found together, a conclusion which the writer considers in opposition to certain statements of Galton, Venn and West. The measurements taken were those of height, breadth of shoulders, circumference of chest and of head, weight and span of arms.] **A. Binet.** 'Attention et Adaptation.' [Record of a long series of experiments made on eleven pupils at a primary school in Paris with a view to finding what differences in voluntary attention existed between pupils who on the whole were intelligent, and pupils who on the whole were unintelligent. Attention, however, is here taken in the sense of power of adaptation to a new mental state, rather than in the sense most familiar to psychologists. The chief method of measuring adopted was that of counting the number of errors committed. The principal points on which experiments were conducted were the degree of tactile sensibility on the back of the left hand; reaction time; the counting of a number of small points (visual); the perception of changes in the rapidity of the beats of a special machine somewhat resembling a metronome; the counting of a series of rhythmical sounds; the copying a series of numbers, a sentence, a series of nonsense words and small ornamental designs; memory maxima (series of letters and of numbers); rapidity of perception of words and of designs very rapidly exposed; correction of proofs, by striking out certain letters: simultaneous additions of a unit to three sets of figures. The experiments were many in number, and seem to have been conducted with considerable care and ingenuity. Dr. Binet considers that he has shown that between the groups of intelligent and unintelligent there was a clear difference, and that the difference was most marked in the first experiment of each series, and that it rapidly tended to disappear in successive experiments of the same kind. Mental adaptation does not follow the same rule in the two groups; the intelligent adapt themselves

more quickly, but as the effects of exercise accumulate the differences between the two groups tend to disappear.] **A. Binet.** 'Recherches sur la sensibilité tactile pendant l'état de distraction.' [Method of distraction employed: that of making the subject count aloud, continuous addition of seven. Three subjects were experimented with. The results tend to show that the susceptibility to distraction in different persons varies a good deal; that the state of distraction shows itself by some degree of verbal automatism consisting in generalising the answers which are in the majority when the attention is properly fixed. Thus in discriminating contacts (Weber's experiment) if the answer "two points" is more common owing to the course of the experiments there is a tendency to repeat this answer rather than to say "one point," even where only one point is actually given in sensation.] **Simon.** 'Expériences de Suggestion sur des Débiles.' [On the whole mentally weak children appear to be rather less suggestible than normal children.] **Marage.** 'Formation des Voyelles.' [If the cavity of the mouth alone is employed we have only the whispered vowel; if the larynx alone only the sung vowel; if the two together the spoken vowel.] These original papers, which appear of less direct interest to the psychologist than some which have appeared in former years in this excellent year-book, occupy nearly 500 pages. They are abundantly illustrated by diagrams. The rest of the volume is occupied by short notices of books and articles, and by a bibliographical table consisting of nearly 2,600 entries of works and articles published during 1898 and 1899. In this list, the preparation of which must have been a work of considerable labour, we notice a few unimportant misprints; for instance, Dr. T. B. Hyslop, of Bethlem Hospital, appears in the text (though not in the index) as Hysdop; and there appears to be some confusion between two American bearers of the surname of Hyslop.

Zeitschrift für Psychologie und Physiologie der Sinnesorgane. Bd. xxiv., Heft 1 und 2. **F. Schumann.** 'Beiträge zur Analyse der Gesichtswahrnehmungen.—II. Zur Schätzung räumlicher Grössen.' [(1) Introspection often gives no evidence, in the process of comparison, of anything more than the perceptions and the spoken judgment. We must, therefore, either systematise our experiments, until the introspective report becomes fuller, or vary our method, with the hope of bringing indirect aid to introspection. The former plan is here attempted with certain optical illusions. Proofs that the estimation of lines, distances, etc., depends not only upon the figures themselves, but also upon the surrounding spaces. (2) The two modes of comparison: simultaneous and successive. Explication of factors in simultaneous comparison: involuntary grouping, the prominence (Hervortreten) of lines or interspaces, intimacy of connexion of certain parts, etc. Special discussion of the overestimation of the height of a square. The self-insistence of the part-contents 'extent' as a direct criterion.] **A. Meinong.** 'Abstrahiren und Vergleichen.' [Directed primarily against Cornelius. (1) The two views 'comparison' and 'abstraction'. (2) The appeal to experience: every instance taken makes against comparison and for abstraction. (3) The value of comparison as an hypothesis. The two fundamental questions: (*a*) given that *a* is like two objects, *m* and *n*; how does the case in which *a* resembles them in different respects differ from the case in which it resembles them in the same respect? and (*b*) given two objects only, which may be alike not merely in one and the same respect but in different respects, but which may also be alike in one respect and different in another; how do the two cases differ? The comparison hypothesis has recourse to two subsidiary hypotheses: that of the similarity series, and that of the

qualitative individuality of the different similarities. Neither saves it. (4) The comparison hypothesis is untenable *a priori*: it makes simple objects like and unlike in different respects, while the objects attain the definiteness which is at first lacking to them only by way of comparison. As extended to objects of a 'higher order,' the fundamental notion of similarity itself becomes unworkable and self-contradictory. (5) Results. The problem of the abstraction theory is the possibility of abstraction in simple cases. Solution, in terms of the distinction of object and contents of an idea.] **K. Heilbronner.** 'Weiterer Beitrag zur Kenntniss der Beziehungen zwischen Aphasie und Geisteskrankheit.' [Present status of a case described by Wernicke in 1890. Apparent dementia, showing on closer scrutiny a number of constant and circumscribed defects. Remarks on association, inference, capacity of attention.] **H. Cornelius.** 'Zur Theorie der Abstraction.' [Restatement of the author's theory of abstraction, with special reference to Lipps' objections in vol. xxii. (1) The problem of the *distinctio rationis* in the sphere of sense perception. (2) The origin of the concepts of attribute or property. Illustration from tones: reply to Lipps. (3) The difference between primary knowledge (the author's 'subjective existential judgment' of earlier publications) and judgment. The primary knowledge of difference and of likeness: the latter gives the explanation of the origin of the concepts of attribute. The distinction of Vorgefundensein and Beachten.] **G. E. Mueller.** 'Ueber die Vergleichung gehobener Gewichte.' [Reply to Cattell.] Besprechung. [S. Witasek on L. J. Martin and G. E. Müller, Zur Analyse der Unterschiedsempfindlichkeit: experimentelle Beiträge.] Literaturbericht. Bd. xxiv., Heft 3 und 4. **E. Storch.** 'Haben die niederen Thiere ein Bewusstsein?' [Critique of Edinger. Plea for a thorough-going parallelism: the doctrine that movement is the objective side of consciousness, consciousness the subjective side of movement; that the two causal series never interpenetrate; that 'matter' is accordingly possessed of 'memory.'] **T. Elsenhans.** 'Ueber Verallgemeinerung der Gefühle.' [There are two possibilities. (1) The feelings share in the generalisation-process to which the ideas wherewith they are associatively connected are subject. This case is realised in the word-feelings. Generalised word-feelings show a greatly reduced intensity, and more or less indeterminateness of quality. These characters are referrible neither to the degree of intensity nor to the grade of clearness of the generalised idea, but rather to the teleological connexion between the feelings and the psychophysical organism. (2) Separate feelings fuse to give feelings of more general nature, Wundt's 'total feelings'. This case is realised in the 'common feeling' of bodily health, etc. Such a feeling evinces defective localisation, qualitative indeterminateness, and an average dependence of intensity upon the maximal intensity of the component feelings. (3) Instances of the fusion of feelings (Ribot). Intellectual (Sprachgefühl), æsthetic, ethical, religious feelings.] **W. von Zehender.** 'Die Form des Himmelsgewölbes und das Grösser-erscheinen der Gestirne am Horizont. Ausführliche Begründung meines kurzen Nachtrages zu meiner Arbeit über "Geometrisch-optische Täuschung".' [(1) Previous work: R. Smith, Drobisch, Kämtz, Reimann. (2) The influence of the cloud sheet on estimation. (3) Reimann's estimates. New experiments by von Sicherer give a higher value, about 40°. (4) Kästner's analysis takes Smith's data for granted; it furnishes no new evidence. (5) Desaguilier's experiments in proof of the position that an object of constant magnitude and distance varies in apparent size with our idea of its nearness; Zoth's questionary concerning the illusions of size and distance of the moon. (6) Experiments, especially those of Zoth and Stroobant, on the moon illusion. (7) The writer's views.

Importance of Volkmann's observation that apparent verticals converge above. Advantages of the idea that cosmic space is spherical. Appendix: Treiber's tract, *De figura et colore coeli apparente.*] **M. Lobsien.** 'Ueber binaurales Hören und auffällige Schallocalisation: einige Bemerkungen.' [Experiments based upon a chance discovery of false localisation: a left-hand sound is localised to the right. Apparatus, method, the breadth and position of the zone of transference. Hints towards explanation: physiological causes are probable.] Literaturbericht.

PHILOSOPHISCHE STUDIEN. Bd. xvi., Heft 2. **W. Ament.** 'Ueber das Verhältniss der ebenmerklichen zu den übermerklichen Unterschieden bei Lichtund Schallintensitäten.' [(1) Two methods of approach: comparison of the j. n. differences ascertained for a given stimulus-series with larger differences in the same series (direct procedure), and comparison of the uniformities of relation obtained by minimal changes on the one hand and by mean gradations on the other (indirect procedure). (2) Merkel found the relative S. D. constant within limits in minimal changes, but got with mean gradations a value lying between the arithmetical and geometrical means; Angell found the geometrical mean. The reason for the discrepancy is the small range of stimulus-relations employed by Angell. (3) With light stimuli and the direct procedure there is found a divergence between the results of difference determination and difference comparison; with sound stimuli there is a divergence in both procedures. (4) This divergence depends upon the magnitude and position of the compared differences. (5) Hence *the difference limen is a magnitude that increases with the stimuli;* Fechner's belief that it affords the measurement-unit in sensation measurement must be given up. (6) The divergence referred to cannot be ascribed to the time-error, etc., in mean gradations. (7) In this method, *R m* approximates to the strongest stimulus much more closely in the ascending than in the descending procedure. (8) No contrast influence could be made out with certainty in the sound experiments.] **M. K. Smith.** 'Rhythmus und Arbeit.'—II. [(4) Detailed account of eight memory series, with letters and nonsense syllables. Introspective answers to questions on the importance of rhythm as facilitating the learning of nonsense syllables; on the influence of rhythm upon feeling and attention; on the appeal of rhythm to ear or eye; on the part played by it in reproduction; on the origin of the tendency to group-formation; on the characteristics of a 'difficult' series; on the part played in memorising by associations of auditory impression, of contents, and of spatial position; and on the influence of the moving kymograph upon learning. (5) Experiments upon purely visual learning; conventional figures substituted for syllables and letters. (6) Conclusions. There is a constraint to the motor rhythmisation of continued movements, just as there is to the subjective accentuation of uniform sound series. Natural *versus* imposed rhythms. Rhythm is "an emotion, whose motor (and therefore in part whose vasomotor) expressions and discharges cannot run an entirely free course, as is the case in the ordinary emotions, but are regulated temporally and intensively in accordance with a determinate schema". The application of rhythm to the regulation of movements, the result of which we term 'work,' is of purely mental origin. (7) Two extra-series, the one ergographic, the other with lifted weights. Details are to be published later.] Bd. xvi., Heft 3. **F. Krueger.** 'Beobachtungen uber Zweiklange.'—I. [First part of a very careful inquiry into the characteristics of two-tone connexions. All the phenomena resulting from the sounding together of two tuning-fork tones are to be observed and described, with the view (*a*) of gaining a factual basis for a theory of consonance and dissonance, and (*b*) of

securing material that shall be valuable for a general theory of audition. Method and apparatus. Observations in the once, twice and thrice accented octave (in the first two, with all intervals differing by four vs. and multiples of four vs.; in the last, with intervals differing by eight vs.) upon (1) the intermediate tone and the primary tones in narrow intervals; (2) four or five different kinds of difference tone; (3) summation tones; (4) nine to eleven kinds of beats; (5) affective impression. There follow (6) general remarks upon the duration and temporal succession of the combination tones.] **J. Zeitler.** 'Tachistoskopische Untersuchungen über das Lesen.' [(1) New tachistoscope, on the basis of Cattell's fall-chronometer; constants of the apparatus. (2) Reading may be either apperceptive, mainly determined by the directly seen word-elements; or assimilative, due to an apperception based upon assimilations in which the secondarily reproduced elements preponderate. (3) Method: reasons for choice of exposure time, of size of letters, etc. (4) The determinants of attention, and the fluctuation of the fixation-point of attention within the range of attention. (5) "Simultaneity of apprehension resolves itself, in tachistoscopy, into a succession, the separate links of which follow so quickly the one upon the other that for the observer they fuse at once into a single whole." (6) The roaming of attention is, therefore, always present objectively, though it becomes subjectively noticeable only with a long exposure time and in the case of long words (fifteen letters and over). (7) The range of attention is four to seven nonsense letters without vowels; five to eight nonsense letters with vowels; six to ten letters arranged in nonsense syllables; fifteen to twenty-five letters arranged in words; twenty to thirty letters (four to five short words) in words arranged as sentences. (8) Experiments and detailed results. (9) Number and time of expositions: a single exposition is preferable to Cattell's method of repetition. (10) Critique of Cattell's experiments. (11) Critique of theories of reading by word-length and word-form (Erdmann and Dodge, Pillsbury), and by determining letters (Goldscheider and Müller). Theory of the 'dominant complex'. (12) Instances of assimilation by similarity (Lichtenberg, Pillsbury, Erdmann and Dodge). (13) Experiments on assimilation, after Pillsbury's model. (14) Experiments with suggestion. (15) Experiments with omission of letters. (16) Inversions and permutations.]

Philosophisches Jahrbuch. Bd. xiii. Heft 3. **E. Rolfes.** 'Neue Untersuchen über die platonischen Ideen.' [This is the first of a series of articles in which the writer intends thoroughly to sift the question whether Plato fell into the crude error of attributing a separate existence to his 'Ideas,' or whether, as Augustine thinks, he understood by them the eternal laws of things in the Divine Mind.] **J. Donat.** 'Zur Frage über den Begriff des Schönen.' [The writer reviews favourably a work by Father Gietmann. The Beautiful is that alone which gives intellectual and sensible delight. Beauty is in itself the splendour of truth or perfection; for us artistic beauty is that splendour sensibly manifested.] **J. Geyser.** 'Die erkenntnisstheoretische Grundlage d. Wissens bei Cartesius.' [The attack on Descartes is followed up. His argument to prove God's existence is criticised; his principle on which he proves it shown to be a *petitio principii*, which, if admitted, would make things true, because we know them to be true, not conversely, and ends in a *circulus vitiosus*.] **J. Bauer.** 'Die actuell unendliche Zahl in der Philosophie und in der Natur.' [This paper is preliminary; it points out the different opinions on the existence of an infinite number, the distinctions in the senses of *infinity*, and also of *possibility*.] **W. Engelkemper.** 'Die Lehre Saadia Gaon's uber die *Aufhebung des Gesetzes*.' [An important chapter of Saadia Gaon's work in Arabic, translated. The translation comes to an end in this paper.]

VIII.—NOTES.

PROF. SIDGWICK'S ETHICAL VIEW; AN AUTO-HISTORICAL FRAGMENT.[1]

My first adhesion to a definite Ethical system was to the Utilitarianism of Mill: I found in this relief from the apparently external and arbitrary pressure of moral rules which I had been educated to obey, and which presented themselves to me as to some extent doubtful and confused; and sometimes, even when clear, as merely dogmatic, unreasoned, incoherent. My antagonism to this was intensified by the study of Whewell's *Elements of Morality*, which was prescribed for the study of undergraduates in Trinity. It was from that book that I derived the impression—which long remained uneffaced—that Intuitional moralists were hopelessly loose (as compared to mathematicians) in their definitions and axioms.

The two elements of Mill's view which I am accustomed to distinguish as Psychological Hedonism [that each man does seek his own Happiness] and Ethical Hedonism [that each man ought to seek the general Happiness] both attracted me, and I did not at first perceive their incoherence.

Psychological Hedonism — the law of universal pleasure-seeking — attracted me by its frank naturalness. Ethical Hedonism, as expounded by Mill, was morally inspiring by its dictate of readiness for absolute self-sacrifice. They appealed to different elements of my nature, but they brought these into apparent harmony: they both used the same words "pleasure," "happiness," and the persuasiveness of Mill's exposition veiled for a time the profound discrepancy between the natural end of action—private happiness, and the end of duty—general happiness. Or if a doubt assailed me as to the coincidence of private and general happiness, I was inclined to hold that it ought to be cast to the winds by a generous resolution.

But a sense grew upon me that this method of dealing with the conflict between Interest and Duty, though perhaps proper for practice, could not be final for philosophy. For practical men who do not philosophise, the maxim of subordinating self-interest, as commonly conceived, to "altruistic" impulses and sentiments which they feel to be higher and nobler is, I doubt not, a commendable maxim; but it is surely the business of Ethical Philosophy to find and make explicit the rational ground of such action.

I therefore set myself to examine methodically the relation of Interest and Duty.

[1] This account by Prof. Sidgwick of the growth of his ethical view occurs as part of the notes of a lecture used for oral delivery, and is not in a finished condition, although in essentials coherent and complete. The evident gap on p. 290 has been filled in by help of detached passages which occur elsewhere. E. E. C. J.

This involved a careful study of Egoistic Method to get the relation of Interest and Duty clear. Let us suppose that my own Interest is paramount. What really is my Interest, how far can acts conducive to it be known, how far does the result correspond with Duty (or Wellbeing of Mankind)? This investigation led me to feel very strongly *this* opposition, rather than that which Mill and the earlier Utilitarians felt between so-called Intuitions or Moral Sense Perceptions, and Hedonism, whether Epicurean or Utilitarian. Hence the arrangement of my book —ii., iii., iv. [book ii. Egoism, book iii. Intuitionism, book iv. Utilitarianism].

The result was that I concluded that no complete solution of the conflict between my happiness and the general happiness was possible on the basis of mundane experience. This [conclusion I] slowly and reluctantly accepted—*cf.* book ii. chapter v., and last chapter of treatise [book ii. chapter v. is on "Happiness and Duty," and the concluding chapter is on "The Mutual Relations of the Three Methods"]. This [was] most important to me.

In consequence of this perception, moral choice of the general happiness or acquiescence in self-interest as ultimate, became practically necessary. But on what ground?

I put aside Mill's phrases that such sacrifice was "heroic": that it was not "well" with me unless I was in a disposition to make it. I put to him in my mind the dilemma: Either it is for my own happiness or it is not. If not, why [should I do it]? It was no use to say that if I was a moral hero I should have formed a habit of willing actions beneficial to others which would remain in force, even with my own pleasure in the other scale. I knew that at any rate I was not the kind of moral hero who does this without reason; from *blind* habit. Nor did I even wish to be that kind of hero: for it seemed to me that that kind of hero, however admirable, was certainly not a philosopher. I must somehow *see* that it was right for me to sacrifice my happiness for the good of the whole of which I am a part.

Thus, in spite of my early aversion to Intuitional Ethics, derived from the study of Whewell, and in spite of my attitude of discipleship to Mill, I was forced to recognise the need of a fundamental ethical intuition.

The utilitarian method—which I had learnt from Mill—could not, it seemed to me, be made coherent and harmonious without this fundamental intuition.

In this state of mind I read Kant's *Ethics* again: I had before read it somewhat unintelligently, under the influence of Mill's view as to its "grotesque failure".[1] I now read it more receptively and was impressed with the truth and importance of its fundamental principle: *Act from a principle or maxim that you can will to be a universal law—cf.* book iii., chapter i., § 3 [of *The Methods of Ethics*]. It threw the "golden rule" of the gospel ("Do unto others as ye would that others should do unto you") into a form that commended itself to my reason.

Kant's resting of morality on Freedom did not indeed commend itself to me,[2] though I did not at first see, what I now seem to see clearly, that it involves the fundamental confusion of using "freedom" in two distinct senses—"freedom" that is realised only when we do right, when

[1] Kant's *Fundamental Principles* (*Grundlegung zur Metaphysik der Sitten*), §§ 1, 2. Mill, *Utilitarianism*, pp. 5, 6 [7th edition (large print), 1879].

[2] Book i., chap. v., of *The Methods of Ethics*.

reason triumphs over inclination, and "freedom" that is realised equally when we choose to do wrong, and which is apparently implied in the notion of ill-desert. What commended itself to me, in short, was Kant's ethical principle rather than its metaphysical basis. This I briefly explain in book iii., chapter i., § 3, [of *The Methods of Ethics*]. I shall go into it at more length when we come to Kant.

That whatever is right for me must be right for all persons in similar circumstances—which was the form in which I accepted the Kantian maxim—seemed to me certainly fundamental, certainly true, and not without practical importance.

But the fundamental principle seemed to me inadequate for the construction of a system of duties; and the more I reflected on it the more inadequate it appeared.

On reflexion it did not seem to me really to meet the difficulty which had led me from Mill to Kant: it did not settle finally the subordination of Self-Interest to Duty.

For the Rational Egoist—a man who had learnt from Hobbes that Self-preservation is the first law of Nature and Self-interest the only rational basis of social morality—and in fact its actual basis, so far as it is effective—such a thinker might accept the Kantian principle and remain an Egoist.

He might say, "I quite admit that when the painful necessity comes for another man to choose between his own happiness and the general happiness, he must as a reasonable being prefer his own, *i.e.* it is right for him to do this on my principle. No doubt, as I probably do not sympathise with him in particular any more than with other persons, I as a disengaged spectator should like him to sacrifice himself to the general good: but I do not expect him to do it, any more than I should do it myself in his place."

It did not seem to me that this reasoning could be effectively confuted. No doubt it was, from the point of view of the universe, reasonable to prefer the greater good to the lesser, even though the lesser good was the private happiness of the agent. Still, it seemed to me also undeniably reasonable for the individual to prefer his own. The rationality of self-regard seemed to me as undeniable as the rationality of self-sacrifice. I could not give up this conviction, though neither of my masters, neither Kant nor Mill, seemed willing to admit it: in different ways, each in his own way, they refused to admit it.

I was, therefore, [if] I may so say, a disciple on the loose, in search of a master—or, if the term 'master' be too strong, at any rate I sought for sympathy and support, in the conviction which I had attained in spite of the opposite opinions of the thinkers from whom I had learnt most.

It was at this point then that the influence of Butler came in. For the stage at which I had thus arrived in search of an ethical creed, at once led me to understand Butler, and to find the support and intellectual sympathy that I required in his view.

I say to understand him, for hitherto I had misunderstood him, as I believe most people then misunderstood, and perhaps still misunderstand, him. He had been presented to me as an advocate of the authority of Conscience; and his argument, put summarily, seemed to be that because reflexion on our impulses showed us Conscience claiming authority therefore we ought to obey it. Well, I had no doubt that my conscience claimed authority, though it was a more utilitarian conscience than Butler's: for through all this search for principles I still adhered for practical purposes to the doctrine I had learnt from Mill, *i.e.* I still held to the maxim of aiming at the general happiness as the supreme

directive rule of conduct, and I thought I could answer the objections that Butler brought against this view (in the "Dissertation on Virtue" at the end of the *Analogy*). My difficulty was, as I have said, that this claim of conscience, whether utilitarian or not, had to be harmonised with the claim of Rational Self-love; and that I vaguely supposed Butler to avoid or override [the latter claim].

But reading him at this stage with more care, I found in him, with pleasure and surprise, a view very similar to that which had developed itself in my own mind in struggling to assimilate Mill and Kant. [For Butler admits the rationality of self-regard, while also holding that 'Dualism of the Governing Faculty' which I had come to recognise in my examination of Mill's Utilitarianism. According to him "Reasonable Self-love" is one of the two "chief or superior principles in the nature of man," the other (Conscience), which is concerned with Duty to others, being likewise essentially a function of Practical Reason; and, as remarked above, I considered that I could explain Butler's partial difference from me with regard to the dictates of Conscience.] And in reading the writings of the earlier English Intuitionists, More and Clarke, I found the axiom I required for my Utilitarianism [That a rational agent is bound to aim at Universal Happiness], in one form or another, holding a prominent place (*cf. History of Ethics*, pp. 172, 181). There was also the Kantian principle, which I recognised as irresistibly valid, though not adequate to give complete guidance. I was then an "intuitional" moralist to this extent: and if so, why not further? The orthodox moralists, such as Whewell (then in vogue), said that there was a whole intelligible system of intuitions: but how were they to be learnt? I could not accept Butler's view as to the sufficiency of a plain man's conscience: for it appeared to me that plain men argued rather verbally than really.

In this state of mind I had to read Aristotle again; and a light seemed to dawn upon me as to the meaning and drift of his procedure (especially in books ii., iii., iv. of the *Ethics—cf. History of Ethics*, chap. ii., § 9, p. 58, read to end of section).

What he gave us then was the Common Sense Morality of Greece, reduced to consistency by careful comparison: given not as something external to him but as what "we"—he and others—think, ascertained by reflexion. And was not this really the Socratic induction, elicited by interrogation?

Might I not imitate this: do the same for *our* morality here and now, in the same manner of impartial reflexion on current opinion?

Indeed *ought* I not to do this before deciding on the question whether I had or had not a system of moral intuitions? At any rate the result would be useful, whatever conclusion I came to.

So this was the part of my book first written (book iii., chaps. i.-xi.), and a certain imitation of Aristotle's manner was very marked in it at first, and though I have tried to remove it where it seemed to me affected or pedantic, it still remains to some extent.

But the result of the examination was to bring out with fresh force and vividness the difference between the maxims of Common Sense Morality (even the strongest and strictest, *e.g.* Veracity and Good Faith) and the intuitions [relating to Duty to others] which I had already attained, *i.e.* the Kantian Principle (of which I now saw the only certain element in Justice—"treat similar cases similarly"—to be a particular application), and the Fundamental Principle of Utilitarianism. And this latter was in perfect harmony with the Kantian Principle. I certainly could will it to be a universal law that men should act in such a way as to promote universal happiness; in fact it was the only law that it was

perfectly clear to me that I could thus decisively will, from a universal point of view.

I was then a Utilitarian again, but on an Intuitional basis.

But further, the reflexion on Common Sense Morality which I had gone through, had continually brought home to me its character as a system of rules tending to the promotion of general happiness (*cf.* pp. 473, 474 [of *The Methods of Ethics*]).

Also the previous reflexion on hedonistic method for book ii. had shown me its weaknesses. What was then to be done? [The] conservative attitude [to be observed] towards Common Sense [is] given in chapter v. of book iv.: "Adhere generally, deviate and attempt reform only in exceptional cases in which,—notwithstanding the roughness of hedonistic method,—the argument against Common Sense is decisive".

In this state of mind I published my book: I tried to say what I had found: that the opposition between Utilitarianism and Intuitionism was due to a misunderstanding. There was indeed a fundamental opposition between the individual's interest and either morality, which I could not solve by any method I had yet found trustworthy, without the assumption of the moral government of the world: so far I agreed with both Butler and Kant.

But I could find no real opposition between Intuitionism and Utilitarianism. . . . The Utilitarianism of Mill and Bentham seemed to me to want a basis: that basis could only be supplied by a fundamental intuition; on the other hand the best examination I could make of the Morality of Common Sense showed me no clear and self-evident principles except such as were perfectly consistent with Utilitarianism.

Still, investigation of the Utilitarian method led me to see defects [in it]: the merely empirical examination of the consequences of actions is unsatisfactory; and being thus conscious of the practical imperfection in many cases of the guidance of the Utilitarian calculus, I remained anxious to treat with respect, and make use of, the guidance afforded by Common Sense in these cases, on the ground of the general presumption which evolution afforded that moral sentiments and opinions would point to conduct conducive to general happiness; though I could not admit this presumption as a ground for overruling a strong probability of the opposite, derived from Utilitarian calculations.[1]

[1] This 'Fragment' is incorporated in the Preface to the forthcoming Sixth Edition of *The Methods of Ethics*.

MEMORIAL TO THE LATE PROF. HENRY SIDGWICK.

A movement has been set on foot for a memorial to the late Prof. Sidgwick. An Executive Committee has been appointed and has decided that the memorial shall, if possible, take the shape of a Lectureship in Moral Science, to be called the Sidgwick Lectureship. The Committee hope accordingly to raise a sum large enough to make it possible to offer a Fund to the University which will suffice for the establishment of a University Lectureship in Moral Science to be called the Sidgwick Lectureship. The minimum stipend of a University Lecturer is £50, and it is desirable that the Fund should amount to not less than £2000.

Subscriptions towards the Sidgwick Memorial Fund may be sent to the Treasurer (Dr. Peile, Master of Christ's College), or may be paid directly to the Sidgwick Memorial Account at the bank of Messrs. Barclay & Co. Mortlock's Bank, Cambridge.

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MIND

A QUARTERLY REVIEW

OF

PSYCHOLOGY AND PHILOSOPHY.

I.—IS POSITION IN TIME AND SPACE ABSOLUTE OR RELATIVE?

By Bertrand Russell.

The purpose of the present paper is to reopen a discussion which has been generally regarded as definitively closed. We have all been taught to believe that time and space consist wholly of relations, and that moments and points are mathematical fictions. It is this opinion that I wish to challenge. I shall endeavour to state, as precisely as possible, both the absolute and the relative theory in each case; to show that, in the case of time, provided we take any account of facts, it is difficult, if not impossible, to free the relational theory from contradiction; to prove that, in the case of space, the relational theory must be so modified, if it is to be logically permissible, as to lose all the advantages which it claims over the absolute theory; and finally, by an examination of Lotze's arguments against absolute space, to demonstrate the falsity of the logic from which these arguments are derived. The discussion has to be conducted differently in the two cases of space and time. The paper, therefore, will consist of three parts: the first will be concerned with time, the second with space, and the third with Lotze's arguments concerning space. I shall not be concerned directly with the existence of space and time, but only with their logical analysis: that is, I shall not raise the question whether what appears to exist in space and time is mere appearance,

but only the question what space and time must be if what appears to occupy them does exist. It should be observed, however, that, if I succeed in constructing a logically permissible account of space and time, the chief reason for regarding their contents as mere appearance is thereby destroyed.

With regard to time, I assume that there is some definite series whose relations are temporal, *i.e.*, some series such that any two of its terms are either simultaneous, or are one before and the other after. This series is one-dimensional, and is also *compact*, *i.e.*, if A be before B, there is some term C which is before B and after A. With regard to such series in general, we may distinguish two theories, the absolute and the relative.[1] In the absolute theory, we have two classes of entities, (1) those which *are* positions, (2) those which *have* positions. Any two terms of the first class have an asymmetrical transitive relation: in the present case, either *before* or *after*. The terms which have positions are terms each of which has, to one or more of the terms which are positions, a certain specific relation, which may be expressed by saying that the new terms are *at* the positions, or that they occupy the positions. By compounding a term which has one or more positions with one of the positions which it has, we obtain a complex term, *i.e.*, the said term at the position; this new complex term contains the position as a constituent, but contains only one such position. In the case of time, two such terms which contain the same moment as constituent are said to be simultaneous; two which contain different moments are *said* to be one before and the other after, by correlation with the moments they contain, but this new relation of before and after is complex, containing as a constituent the before and after of moments. We may call *qualities* the terms which have positions in time; thus a quality may be at many moments, or even at all moments. The compound formed of a quality at a time may be called an *event;* thus an event is logically incapable of recurrence. Two events are simultaneous when both are qualities *at* one time; otherwise they are successive. We have thus three simple relations, *before*, *after* and *at*. Before and after are transitive and asymmetrical, *at* is intransitive and asymmetrical. The relation of an event to its moment, which is derivative, is also intransitive and asymmetrical; moreover it is, unlike *at*, a many-one relation: *i.e.*, though many events may be in a moment, there is only one

[1] See MIND, January, 1901, p. 35.

moment in which a given event can be. This is the absolute theory of time.

In the relational theory we do not require two different classes of entities, but we still require three simple relations. We have here a single class of entities, which may be called events, any two of which have one and only one of three unanalysable relations, simultaneity, priority and posteriority. All three are transitive; the first is symmetrical, while the other two are asymmetrical. Further, if A be simultaneous with B, and B be before C, A is before C; and if B be after C, A is after C. (These two properties are independent.) This is the relational theory.

The relational theory may seem, at first sight, simpler than the absolute theory, but in its application a great difficulty arises from the absence of any such class of entities as the events which it requires. Before developing this difficulty, we must observe that simultaneity must be strictly unanalysable. If two events were simultaneous because they had some common property not shared by events not simultaneous with them, the collection of all such common properties of different groups of simultaneous events would have exactly the characteristics by which we defined absolute time. Now for my part I consider it self-evident that all symmetrical transitive relations are analysable; and if this axiom were admitted, the relational theory would fall at once. But as my opponents will allow no such principle, I shall not appeal to it in what follows.

When we begin the search for events answering to the above definition, we are met by the following difficulty. Whatever can, in ordinary language, recur or persist, is not an event; but it is difficult to find anything logically incapable of recurrence or persistence, except by including temporal position in the definition. When we think of the things that occur in time—pleasure, toothache, sunshine, etc.—we find that all of them persist and recur. In order to find something which does not do so, we shall be forced to render our events more complex. The death of Cæsar or the birth of Christ, it may be said, were unique: they happened once, but will never happen again. Now it is no doubt probable that nothing exactly similar to these events will recur; but, unless the date is included in the event, it is impossible to maintain that there would be a logical contradiction in the occurrence, in the future, of a precisely similar event. Perhaps it may be said that the whole state of the universe has the required uniqueness: we may be told that it is logically impossible for the universe to be twice in the same

state. But let us examine this opinion. In the first place, it receives no countenance from science, which, though it admits such recurrence to be improbable, regards it as by no means impossible. In the second place, the present state of the universe is a complex, of which it is admitted that every part may recur. But if every part may recur, it seems to follow that the whole may recur. In the third place, this theory, when developed so as to meet the second objection, becomes really indistinguishable from that of absolute position. There is no longer an unanalysable relation of simultaneity: there are a series of states of the universe, each of which, as a whole and only as a whole, has to each other a simple relation of before and after; an event is any part of a state of the universe, and is simultaneous with any other part of the same state, simultaneity meaning merely the being parts of some one state; before and after do not hold between events directly, but only by correlation. Thus the theory in question, except for the fact that *at* is no longer simple, is merely the absolute theory with states of the whole universe identified with moments. The reasons against such an identification are, first, that events seem to have an order which does not, in its very meaning, involve reference to the whole universe, and secondly, that immediate inspection seems to show that recurrence of the whole state of the universe is not logically absurd.

If the advocate of the relational theory abandons the search for events with a unique temporal position, and confines himself to what, in the absolute theory, we called qualities, he will find it impossible to obtain a time-series at all. In this view, we endeavour to obtain events by means of the mutual relations of qualities, but this endeavour is frustrated by the fact that simultaneity, priority and posteriority are no longer mutually incompatible. It is necessary now to hold that qualities as such have temporal relations. Thus if I feel first pain and then pleasure, we shall be forced to hold that pain as such precedes pleasure as such. We cannot say that this sequence occurs now, but not always, for *now* is constituted by its contents, of which the pain and the pleasure form part. And we have already seen that it is useless to take qualities more complex than pleasure. But we must also admit that pleasure precedes pain, and that pleasure and pain are simultaneous; for these cases also occur. But this destroys the whole time-series, which depends, as all series do, upon the mutual incompatibility of its constitutive relations. The *now* is wholly vague, for among the qualities simultaneous with a given quality, many, if not

all, will also be prior or posterior to it; if the quality be one which persists or recurs, all qualities simultaneous with it must also be prior and posterior to it. Thus the whole time-series collapses: the passage from events to qualities cannot be made, and the edifice of temporal propositions crumbles.

The same argument may be put as follows. It must be admitted that there is some class of entities for which simultaneity is transitive. If A, B, C be such entities, and A and B, B and C are simultaneous, so are A and C. But among qualities this does not hold. For qualities may recur, and recurrence can only mean, on the theory in question, simultaneity with qualities not simultaneous with one another. This contradicts our principle, and shows that it is not between qualities as such that temporal relations hold. In short, if terms which are not positions are to be arranged serially by means of three relations, all transitive and two asymmetrical, while the third is symmetrical, then these three relations must be mutually incompatible. This condition is satisfied by events, but not by qualities. It is impossible, however, owing to the fact of recurrence, to pass from qualities to events without assuming moments. We may divest the argument of all temporal reference, and our result is then seen to be at once demonstrable and obvious. It is as follows: When a collection of terms are capable of serial arrangement, but some among them occur in several positions in the series, then the terms in question form a series which is not independent, but is obtained by some many-many or one-many relation which each of them has to one or more terms of some independent series.

In regard to space, no such simple argument is possible. For this there are three chief reasons. (1) There are, apparently, no existents in space which are not also in time, whereas mental qualities are in time, but are often held to be not in space. (2) It cannot be taken as a self-evident premiss that two things or qualities may have a symmetrical transitive relation such as would be called occupation of the same place, whereas it is evident that two events may be simultaneous. (3) Common sense recognises no entities having a fixed position in space, as events have in time: there is in space nothing corresponding to dates, but all things in space are held to be perpetually in motion. To these must be added, as a minor cause of difficulty, the greater complexity introduced by dimensions. For these reasons, a direct proof of absolute position, from premisses universally admitted, will not be found in what follows, though it is possible that such a proof may be discoverable. Nevertheless, I shall give

grounds for thinking that the relational theory leads to paradoxical results, and that it needs emendations which rob it of the merits that have endeared it to philosophers. When this has been done, I shall endeavour to refute the current refutations of the absolute theory.

The first requisite—though it is one which is universally neglected—is to set forth precisely the two theories which are to be compared. And since it is in the detailed development that the relational theory mainly shows its weakness, it seems necessary to give a fairly full statement of what space is on the two theories. For this purpose, I shall assume that space is Euclidean or hyperbolic—an assumption which does not affect the present argument.

In the absolute theory, a space is a class of entities, called *points*, and having relations of a certain type. The type is somewhat complicated, but may be set forth as follows: Any two distinct points have one and only one asymmetrical transitive relation of a certain class; the converse relation also belongs to the class, and no relation of the class holds between anything except points. If a and b, c and d, be pairs of points having the same relation of the class in question, then a and c, b and d also have this relation or its converse. All the points forming what may be called the extension of a given relation of the class are a series which is endless and compact (*i.e.*, has a term between any two). Such a series is called a *straight line*. It follows from what has been said that the converse relation defines the same straight line, and that two lines cannot have more than one point in common. There are points not on a given straight line. If ab be a given straight line, c a point not on ab, e a point on ab, and d a point on ce such that e is between c and d, then the class of points x, such that either x lies on ab, or cx meets ab in a point between c and x, or dx meets ab in a point between d and x, is called the *plane abc*. If a, b, c be any three non-collinear points, and g be a point between b and c, e a point between a and g, then there is a point f which is between a and c, and between which and b the point e is. Also if f is given between a and c, there is a point e between a and g and between b and f, which is the converse of the former property. Hence it follows that a plane is determined by any three of its points, and contains the line joining any two of its points. But given any plane, there will be points outside the plane. Proceeding to define a three-dimensional figure as the plane was obtained from the straight line and the point, this new figure will contain all points.[1] It remains to add the metrical

[1] The above is obtained from Peano, *Sui Fondamenti della Geometria*, *Rivista di Matematica*, iv., p. 51 ff.

properties of our space. The stretch of points between two given points has a certain magnitude; from any given point, and in either direction along any given line through the point, there is one and only one stretch equal to any given stretch; if $a_0\,a_1$, $a_1\,a_2$, . . . $a_{n-1}\,a_n$ be n equal stretches along the same straight line, and d be any given stretch, then, for some finite value of n, $a_0\,a_n$ will be greater than d; if a_0, a_n be any two points, and n any finite integer, there are n-1 distinct points $a_1, a_2, \ldots a_{n-1}$ on the line $a_0\,a_n$, such that the stretches $a_0\,a_1$, $a_1\,a_2$, . . . $a_{n-1}\,a_n$ are all equal. In virtue of our previous assumptions, the defining relations of the lines in a plane through a point form a closed series; a stretch of such relations is called an angle; three assumptions similar to the three concerning stretches of points are required for angles. A few more axioms are required for triangles, areas and volumes; but these need not be here enumerated.[1]

The absolute theory of space asserts that there are entities (points) which answer to the above description, and that the spatial relations in the actual world hold primarily between points, and only by correlation between the contents of space. It may be observed that, complicated as the above account is, it introduces only two indefinables, namely the class *point* and the class of relations by which straight lines are defined. Magnitude of divisibility may be regarded as a third indefinable introduced by metrical geometry, but this is a general logical notion which has no special reference to space.

A detailed statement of the relational theory, comparable to the above statement of the absolute theory, has never been attempted. Let us first endeavour to characterise generally the points in which the relational theory differs from the above, and then, if possible, to state this theory with all the requisite detail.

There are two main differences of the two theories. First, the relational theory holds that there are no entities which, as such and timelessly, have certain spatial relations, but that all spatial relations involve reference to some time at which they hold between some given pair of entities. Even if there be a pair of entities whose spatial relations are unchanging, we can only say that they happen to have these relations at all times, not that they have them timelessly. Or, if we allow that two entities may have a given spatial relation eternally, we shall have to allow also that, as an eternal relation, the relation in question is not incompatible with another which becomes incompatible with it when the time

[1] See Pasch, *Neuere Geometrie*, Leipzig, 1882, § 13.

is taken into account. That is, if we allow that two material points may be eternally a yard apart, we must allow that they may also be eternally two yards apart, and that, from a given eternal relation, nothing can be inferred as to the relation at any given time. Secondly, the relational theory endeavours to dispense with all such entities and relations as are completely indistinguishable and impossible for us to identify. Thus distances, angles, areas, and volumes are more or less sensible, and are (within limits) capable of recognition. But individual points, straight lines, and planes are wholly impossible to recognise. It is not theoretically possible to discover, by immediate inspection, whether the part of space which I see now is the same as or different from the part which I saw at this time yesterday. The relational theory aims at dispensing with all this apparatus of indistinguishable and unrecognisable entities. This second point forms the motive of the theory, while the first seems to constitute its logical definition. I shall endeavour to show that the facts render it impossible wholly to satisfy the motive, and that a relational space according to the definition must still retain material points which, though capable of motion, are not assumed to exist, which will be as unrecognisable as the points of the absolute theory.

In the relational theory, space consists solely of relations; the terms of these relations are therefore non-spatial. Considered merely as terms of spatial relations, they may be called material points. The spatial relations of material points are to be, if possible, all comprised under distance, rectilinear angle, angle between planes, solid angle, area and volume, right and left. Advocates of the relational theory never (so far as I know) mention any relation except distance, but it is to be supposed that they would mention the others if they condescended to details. Any pair of material points has, at a given instant, one and only one distance; any three have three and only three angles, which are, like *between*, relations of one term to two others. Three particles also have one and only one area at a given time. Four particles have one and only one volume, four and only four solid angles, and six and only six angles between planes. All these relations are quantities, and all fulfil the three axioms (or their analogues) mentioned, as regards stretches, in the statement of the absolute theory. Finally, if four material points be such that the four solid angles which they determine are not all zero, then any two of the four have to the remaining two one or other of two symmetrical relations, which may be called right- and left-handedness: these are such that, if one

of them holds between *ab* and *cd*, the other holds between *ab* and *dc*; further, in respect to these relations, motions are not continuous, *i e.*, if *a*, *b*, *c*, be fixed, and *d* movable, *ab*, *cd* may suddenly cease to have either of the two relations, and may, by a further motion of *d*, however small, acquire the opposite relation to that which they had before.[1]

The above outline must now be filled in in detail. Let us begin with distances. In the first place, we may inquire whether distances are symmetrical or asymmetrical. In this inquiry, we must remember that we are not yet in possession of the straight line, so that a given distance cannot be specified as being in a given direction. Thus there may be any number[2] of particles whose distance from a given particle at a given instant is a given distance: this must, in fact, be set up as an axiom. But we cannot infer the distance of two particles from their distances from a third particle. A distance is neither a transitive nor an intransitive relation: if *a* and *b*, *b* and *c* both have a given distance, this may or may not be the distance of *a* and *c*. It seems then that, so long as the straight line has not been obtained, distances must be taken as symmetrical, *i.e.*, the distance of *a* from *b* is the same as that of *b* from *a*. Distances, moreover, must be a kind of magnitudes forming an endless compact series. If the zero of distance be included, distances are a series which has one end; but it must be set up as an axiom that the distance of two distinct material particles is never zero.

The next point to be considered is the nature of angles. Angles are not relations between distances, since they may change when distances remain constant, and remain constant when distances change. They might, it is true, be taken as relations of *three* distances, but it would still be necessary to specify the distances as forming a triangle, which imposes upon our distances limitations of an unknown nature. For until we have the straight line, we cannot add distances, and therefore we cannot say that, in a triangle, two distances together must be greater than the third. Thus it seems best to regard angle as a new fundamental relation of three particles. Between three particles *a*, *b*, *c*, there are to be always three angles, which may be regarded as relations of *a* to *b* and *c*, *b* to *c* and *a*, *c* to *a* and *b* respectively. These relations are to be symmetrical as regards the extremes, *i.e*, the angle which is a relation of *a* to *b* and *c* may be regarded

[1] The reader who is not interested in semi-mathematical details may omit the next three paragraphs with advantage.

[2] "Any number" means here any cardinal number not exceeding that of the continuum.

as a relation of a to c and b, and denoted by bac or cab indifferently. But the relation of the mean to the extreme is to be asymmetrical, *i.e.*, we must not interchange a and b or a and c in the above case. All angles are to be magnitudes, and the series of these magnitudes is to be compact, but unlike distances, it is to have two ends. One of these ends is the zero of angle, which, unlike the zero of distance, may actually hold between distinct particles. This case is specially important, and several axioms are required for dealing with it. If a, b, c, etc., be all mutually distinct, it may happen that the angles bac and bca are both zero. In this case the angle abc will be the maximum of angle, which will be called two right angles. If d and c be points such that bdc and bca are both zero, then dbc and cba are both two right angles; also bda or bad will be zero, and bad or bda will be two right angles; with similar remarks as regards c. Formally, we may set up the following definitions and axioms.[1] If the angle abc is two right angles, we say that b is between a and c. The relation of *between* has the following properties. Neither a nor c is between a and c, but so long as a and c are distinct, there always may be material points between them, and there always may be material points between which and b lies the material point a. The points a and b, the points (if any) between them, the points x (if any) such that a lies between x and b, and the points y (if any) such that b lies between y and a, are said to lie on the *straight line* ab, and no other points are said to lie on this straight line. If a, d be material points, c a material point between them, and b a material point between a and c, then b is between a and d. If b and c be between a and d, then either b is between a and c, or b is identical with c, or b is between c and d. If b lies between a and c, and also between a and d, then either c and d coincide, or c lies between b and d, or d lies between b and c. If b lies between a and c, and c between b and d, then c lies between a and d. These properties are axiomatic, and mutually independent. From all of them together, but not from any selection of them, it results that the material points on one straight line, however numerous they may be, provided there are more than two, form a series. In virtue of our axioms concerning the connexion of maximum and minimum angles, we may define the straight line, in place of the former definition, as follows: The point c is collinear with a and b when the angle acb is either zero or two right angles. A further axiom is needed,

[1] *Cf.* Peano, *Rivista di Matematica*, iv., p. 55.

namely: if c be between a and b, the stretches ac, cb are both less than ab.

The above properties are sufficient to characterise maximum and minimum angles. But new axioms are required for dealing with other angles. To begin with, if a, b, c be any three non-collinear points, and d a point between a and c, the angle dab is the same as the angle cab. Next, if b, c, e be collinear, and c be between b and e, and a be a point not on the line bc, then the angle bae is greater than either of the angles bac, cae. By means of these axioms, we are able to arrange serially all such lines through a as contain material points on some line not through a, and to show that, if the same lines can be arranged serially by reference to some other line not through a, the order will be unchanged. But we cannot show that *all* lines through a and in one plane form a series, for some triads of them may not have material points on any one given line.

The development of the theory of planes, angles between planes, and solid angles would be extremely complicated, and I shall not undertake it. I shall content myself with a few remarks on areas and volumes. Three material points have at any instant a certain relation called their *area*. This relation is a magnitude, which, in Euclidean space, has no maximum, but which always has a zero. The relation of the kind in question between three collinear points is a zero area. Area is symmetrical with respect to the three terms of the relation. If a, b, c be three non-collinear points, and d a point between b and c, the area abc is defined to be the sum of abd and acd. Similarly if a', b', c', d' be four points in one plane, no three of which are collinear, and there is a material point e' between a' and c' and also between b' and d'; if, further, $a'b'c'$ be equal to our former area abd, and $a'd'c$ to our former area acd, then it is said that a', b', c', d' determine an area equal to abc. But if it should happen that there is no such material point as e', and if neither the stretches $a'b'$, $c'd'$ nor the stretches $a'd'$, $b'c'$ have a common material point e'; or if, though e' exists, there are not, and never have been, and never will be, four material points a, b, c, d satisfying the above conditions; then we cannot say that a', b', c', d', determine an area at all. Moreover we shall need an axiom to assure us that the area $a'b'c'd'$ so defined is the same as the area obtained by summing $b'a'd'$ and $b'c'd'$. Similar remarks apply to polygons of more than four sides. As regards circles, or other curvilinear figures, they can have no area at all; for their area could only be the limit of a sum of a continually increasing number of continually diminishing triangles, and

the conditions for the method of limits are here not fulfilled, since nothing can be *merely* a limit. As regards volumes, we must make precisely similar remarks.

I have now done my best to state precisely some of the more important parts of the relational theory. It will be admitted that its complexity is bewildering. But what is more important is, that it compels us either to abandon many of the usual propositions of geometry, or to allow the notion of *possible* material points. I have hitherto excluded this notion, and I shall continue to do so until the consequences of such exclusion have been examined. We have just seen that only triangles always have areas, and only tetrahedra always have volumes. This is one result which flagrantly contradicts both geometry and common sense. To maintain that a sphere has no volume and a circle no area is surely to condemn the theory from which such consequences follow. Another similar difficulty arises concerning the intersection of straight lines. If two lines ab, cd intersect, that must mean, on the relational theory, that there is now a material point e collinear both with a and b and with c and d. But geometrically, the question whether there is an intersection depends only upon a, b, c, and d, and not upon the empirical existence of some fifth point e. Thus it is an axiom which is essential to geometry that, if a, b, c, d be four points in a plane, either ab, cd, or ac, bd, or ad, bc intersect. Without this axiom, Euclid's seventh proposition cannot be proved. (Euclid's pretended proof, it may be observed, is worthless.) But when an intersection is taken to be a material point, it is plain that no such axiom can be set up. Hence we shall have to take the seventh proposition as an axiom. And the distinction, which must be recognised, between lines which intersect and lines which do not intersect, becomes impossible to state. The same thing appears in regard to points on a line. There is certainly some sense in which it is always true that there *may* be a material point between any two; but on our present theory it is hard to see what this sense can be. The serial arrangement of the lines in a plane through a point, or of the planes through a line, also fails to be general when we confine ourselves to actual material points. These and many analogous respects, in which the relational theory fails, could not be detected formerly, because the axioms of geometry had not been carefully scrutinised; for example, it is only very recently that the order of points, lines, or planes, has been seen to require special axioms. In some sense, it is plain, space is a plenum; that is, there are entities which have any spatial

relation that is possible. But we cannot make these entities actual material points, since, even if there are actual material points everywhere, this is a purely empirical fact, which cannot be invoked as an escape from a logical difficulty.

It remains to examine the notion of possible material points. Since, in the relational theory, all spatial relations hold, not eternally, but at times, the possible material points, if they are to be geometrically useful, must be in time, and they must have changing spatial relations to actual material points. The actual points, in fact, must be merely those among the possible ones which happen to exist. It must be set up as an axiom that, if *a*, *b* be any two possible or actual material points, there is a possible material point between them; and so on. But now we must ask ourselves what reason we have for assuming such possible points at all. We have now a set of spatial relations, all of which always hold between entities, actual or possible, and whose change from time to time consists solely in the fact that it is between different entities that they hold. Given a collection of geometrical relations all belonging at one time to one particle, this collection will belong at every time to some particle. Moreover the collection of geometrical relations belonging to one particle at one time is exactly identical with the collection belonging to the same or any other particle at the same or any other time; for all possible distances, angles, etc., are at all times relations of any given particle to other particles. Motion consists merely in the fact that the same relations which *a* has at one time to (say) *b*, *c*, *d*, etc., it has at another time to (say) *c*, *d*, *b*, etc. That is, the same relations are, as it were, differently shuffled; and this constitutes all that motion can mean. In this notion there is, so far as I can see, nothing self-contradictory, provided it be admitted that a non-existent may be in time and have changing relations. But it must be admitted that the introduction of non-existent material points as an essential part of geometry destroys the plausibility of the relational theory, and renders it no longer able to content itself with data that are in some degree sensible. It seems, at this stage, merely a natural simplification to suppose that there are spatial points, between which primarily spatial relations hold, and *at* some or all of which there are at any given time material points. And then all spatial relations except right and left become definable in terms of *at* and straight lines.

We have now seen that the relational theory, if it confines itself to actual material points, is unable, since the question as to the geometrical distribution of such points must be

empirical, to give an account, which will consist with the facts, of the intersection of geometrical figures, the order of lines and planes, and the nature of areas and volumes. If it invokes other material points, not assumed to exist, but regarded as entities related to time and to existent material points as these are related to time and to each other, it becomes logically admissible, but loses whatever advantage it may possess over the absolute theory. And however we develop it, the complications which it introduces are so great that the mere enumeration of axioms becomes a herculean task. When we come to motion, the additional complications become infinitely greater, since the motion of one particle can only be specified by the changes in its relations to *all* other particles; whereas, in the absolute theory, the motion is specified by the mention of the points at which the particle is at the two times. And there is a special argument, derived from dynamics, to show that the straight line must be an independent relation, not, as in the relational theory, derivative from the collinearity of three particles. This is the argument from what is called absolute rotation, which I have omitted because it demands a long discussion of the laws of motion. But this argument alone, in my opinion, suffices, in the absence of logical grounds on either side, to turn the scale in favour of absolute position.

I come now to the third section of my paper, in which I shall endeavour to answer the current arguments against absolute position. If it can be shown that there are no *a priori* arguments on either side, simplicity and the dynamical argument should decide in favour of the absolute theory. The arguments against this theory are, in my opinion, one and all fallacious. They are best collected in Lotze's *Metaphysic* (§ 108 ff). They are there confused with arguments for the subjectivity of space—an entirely distinct question, as should have been evident from the fact that Kant, in the *Critique*, advocated the theory of absolute position.[1] Omitting arguments only bearing on this latter point, we have the following summary of Lotze's arguments against absolute space.

(1) Relations are only either (α) as presentations in a relating consciousness, or (β) as internal states in the real elements which are said to stand in these relations (§ 109).

(2) The being of empty space is neither the being which works effects (which belongs to a thing), nor the mere validity of a truth, nor the fact of being presented by us. What kind of being is it then? (§ 109).

[1] *Cf.* Vaihinger, *Commentar*, pp. 189-190.

(3) All points are exactly alike, yet every pair have a relation peculiar to themselves; but being exactly like every other pair, the relation should be the same for all pairs (§ 111).

(4) The being of every point must consist in the fact that it distinguishes itself from every other, and takes up an invariable position relatively to every other. Hence the being of space consists in an active mutual conditioning of its various points, which is really an interaction (§ 110).

(5) If the relations of points were a mere fact, they could be altered, at least in thought; but this is impossible: we cannot move points or imagine holes in space. This impossibility is easily explained by a subjective theory (§ 110).

(6) If there are real points, either (α) one point creates others in appropriate relations to itself, or (β) it brings already existing points into appropriate relations, which are indifferent to their natures (§ 111).

(1) All these arguments depend, at bottom, upon the first, the dogma concerning relations. As it is of the essence of the absolute theory to deny this dogma, I shall begin by examining it at some length.[1] "All relations," Lotze tells us, "only *are* as presentations in a relating consciousness, or as internal states in the real elements which, as we are wont to say, stand in these relations." This dogma Lotze regards as self-evident, as indeed he well may; for there is not one anterior philosopher, unless it be Plato, who does not employ the dogma as an essential part of his system. To deny it, therefore, is a somewhat hardy undertaking. Let us, nevertheless, examine the consequences to which the dogma leads us.

It would seem that, if we accept the dogma, we must distinguish two kinds of relations, (α) those which are presentations in a relating consciousness, and (β) those which are internal states of the elements supposed to be related. These may be ultimately identical, but it will be safer in the mean time to treat them as different. Let us begin with those which are only presentations in a relating consciousness. These presentations, we must suppose, are beliefs in propositions asserting relations between the terms which appear related. For it must be allowed that there are beliefs in such propositions, and only such beliefs seem capable of being regarded as presentations in which relations have their being. But these beliefs, if the relations believed

[1] The logical opinions which follow are in the main due to Mr. G. E. Moore, to whom I owe also my first perception of the difficulties in the relational theory of space and time.

to hold have no being except in the beliefs themselves, are necessarily false. If I believe A to be B's father, when this is not the case, my belief is erroneous; and if I believe A to be west of B, when westerliness in fact exists only in my mind, I am again mistaken. Thus this first class of relations has no validity whatever, and consists merely in a collection of mistaken beliefs. The objects concerning which the beliefs are entertained are as a matter of fact wholly unrelated; indeed there cannot even be *objects*, for the plural implies diversity, and all beliefs in the relation of diversity must be erroneous. There cannot even be one object distinct from myself, since this would have to have the relation of diversity to me, which is impossible. Thus we are committed, so far as this class of relations goes, to a rigid monism.

But now, what shall we say of the second class of relations, those namely which are reducible to internal states of the apparently related objects? It must be observed that this class of relations presupposes a plurality of objects (two at least), and hence involves the relation of diversity. Now we have seen that, if there be diversity, it cannot be a relation of the first class; hence it must itself be of the second class. That is, the mere fact that A is different from B must be reducible to internal states of A and B. But is it not evident that, before we can distinguish the internal states of A from those of B, we must first distinguish A from B? *i.e.*, A and B must *be* different, before they can have different states. If it be said that A and B are precisely similar, and are yet two, it follows even more evidently that their diversity is not due to difference of internal states, but is prior to it. Thus the mere admission that there are internal states of different things destroys the theory that the essence of relations is to be found in these states. We are thus brought back to the notion that the apparent relations of two things consist in the internal states of one thing, which leads us again to the rigid monism implied in the first type of relation.

Thus the theory of relations propounded by Lotze is, in fact, a theory that there are no relations. This has been recognised by the most logical adherents of the dogma—*e.g.*, Spinoza and Mr. Bradley—who have asserted that there is only one thing, God or the Absolute, and only one type of proposition, namely that ascribing predicates to the Absolute. In order to meet this development of the above theory of relations, it will be necessary to examine the doctrine of subject and predicate.

Every proposition, true or false—so the present theory

contends—ascribes a predicate to a subject, and—what is a corollary from the above—there is only one subject. The consequences of this doctrine are so strange, that I cannot believe they have been realised by those who maintain it. The theory is in fact self-contradictory. For if the Absolute has predicates, then there are predicates; but the proposition "there are predicates" is not one which the present theory can admit. We cannot escape by saying that the predicates merely qualify the Absolute; for the Absolute cannot be qualified by nothing, so that the proposition "there are predicates" is logically prior to the proposition "the Absolute has predicates". Thus the theory itself demands, as its logical *prius*, a proposition without a subject and a predicate; moreover this proposition involves diversity, for even if there be only one predicate, this must be different from the one subject. Again, since there is a predicate, the predicate is an entity, and its predicability of the Absolute is a relation between it and the Absolute. Thus the very proposition which was to be non-relational turns out to be, after all, relational, and to express a relation which current philosophical language would describe as purely external. For both subject and predicate are simply what they are—neither is modified by its relation to the other. To be modified by the relation could only be to have some other predicate, and hence we should be led into an endless regress. In short, no relation ever modifies either of its terms. For if it holds between A and B, then it is between A and B that it holds, and to say that it modifies A and B is to say that it really holds between different terms C and D. To say that two terms which are related would be different if they were not related, is to say something perfectly barren; for if they were different, they would be other, and it would not be the terms in question, but a different pair, that would be unrelated. The notion that a term can be modified arises from neglect to observe the eternal self-identity of all logical concepts or Platonic ideas, which alone form the constituents of propositions.[1] What is called modification consists merely in having at one time, but not at another, some specific relation to some other specific term; but the term which sometimes has and sometimes has not the relation in question must be unchanged, otherwise it would not be *that* term which had ceased to have the relation.

The general objection to Lotze's theory of relations may

[1] See Mr. G. E. Moore's paper on "The Nature of Judgment," MIND, N.S., vol. viii.

be thus summed up. The theory implies that all propositions consist in the ascription of a predicate to a subject, and that this ascription is not a relation. The objection is, that the predicate is either something or nothing. If nothing, it cannot be predicated, and the pretended proposition collapses. If something, predication expresses a relation, and a relation of the very kind which the theory was designed to avoid. Thus in either case the theory stands condemned, and there is no reason for regarding relations as all reducible to the subject-predicate form.

(2) I come now to the second of Lotze's objections to empty space. This is again of a somewhat abstract logical character, but it is far easier to dispose of, since it depends upon a view more or less peculiar to Lotze. There are, it says, three and only three kinds of being, no one of which belongs to space. These are (α) the being of things, which consists in activity or the power to produce effects; (β) the validity of a truth; (γ) the being which belongs to the contents of our presentations.

The answer to this is, that there is only one kind of being, namely being *simpliciter*, and only one kind of existence, namely existence *simpliciter*. Both being and existence, I believe, belong to empty space; but being alone is relevant to the refutation of the relational theory—existence belongs to the question which Lotze confounds with the above, namely as to the reality or subjectivity of space. It may be well first to explain the distinction of being and existence, and then to return to Lotze's three kinds of being.

Being is that which belongs to every conceivable term, to every possible object of thought—in short to everything that can possibly occur in any proposition, true or false, and to all such propositions themselves. Being belongs to whatever can be counted. If A be any term that can be counted as one, it is plain that A is something, and therefore that A is. "A is not" must always be either false or meaningless. For if A were nothing, it could not be said not to be; "A is not" implies that there is a term A whose being is denied, and hence that A is. Thus unless "A is not" be an empty sound, it must be false—whatever A may be, it certainly is. Numbers, the Homeric gods, relations, chimeras and four-dimensional spaces all have being, for if they were not entities of a kind, we could make no propositions about them. Thus being is a general attribute of everything, and to mention anything is to show that it is.

Existence, on the contrary, is the prerogative of some only amongst beings. To exist is to have a specific relation to

existence—a relation, by the way, which existence itself does not have. This shows, incidentally, the weakness of the existential theory of judgment—the theory, that is, that every proposition is concerned with something that exists. For if this theory were true, it would still be true that existence itself is an entity, and it must be admitted that existence does not exist. Thus the consideration of existence itself leads to non-existential propositions, and so contradicts the theory. The theory seems, in fact, to have arisen from neglect of the distinction between existence and being. Yet this distinction is essential, if we are ever to deny the existence of anything. For what does not exist must be something, or it would be meaningless to deny its existence; and hence we need the concept of being, as that which belongs even to the non-existent.

Returning now to Lotze's three kinds of being, it is sufficiently evident that his views involve hopeless confusions.

(*a*) The being of things, Lotze thinks—following Leibniz here as elsewhere—consists in activity. Now activity is a highly complex notion, which Lotze falsely supposed unanalysable. But at any rate it is plain that, if there be activity, what is active must both be and exist, in the senses explained above. It will also be conceded, I imagine, that existence is conceptually distinguishable from activity. Activity may be a universal mark of what exists, but can hardly be synonymous with existence. Hence Lotze requires the highly disputable proposition that whatever exists must be active. The true answer to this proposition lies (1) in disproving the grounds alleged in its favour, (2) in proving that activity implies the existence of time, which cannot be itself active. For the moment, however, it may suffice to point out that, since existence and activity are logically separable, the supposition that something which is not active exists cannot be logically absurd.

(*β*) The validity of a truth—which is Lotze's second kind of being—is in reality no kind of being at all. The phrase, in the first place, is ill-chosen—what is meant is the truth of a truth, or rather the truth of a proposition. Now the truth of a proposition consists in a certain relation to truth, and presupposes the being of the proposition. And as regards being, false propositions are on exactly the same level, since to be false a proposition must already be. Thus validity is not a kind of being, but being belongs to valid and invalid propositions alike.

(*γ*) The being which belongs to the contents of our presentations is a subject upon which there exists everywhere the

greatest confusion. This kind is described by Lotze as "*ein Vorgestelltwerden durch uns*". Lotze presumably holds that the mind is in some sense creative—that what it intuits acquires, in some sense, an existence which it would not have if it were not intuited. Some such theory is essential to every form of Kantianism—to the belief, that is, that propositions which are believed solely because the mind is so made that we cannot but believe them may yet be true in virtue of our belief. But the whole theory rests, if I am not mistaken, upon neglect of the fundamental distinction between an idea and its object. Misled by neglect of being, people have supposed that what does not exist is nothing. Seeing that numbers, relations, and many other objects of thought, do not exist outside the mind, they have supposed that the thoughts in which we think of these entities actually create their own objects. Every one except a philosopher can see the difference between a post and my idea of a post, but few see the difference between the number 2 and my idea of the number 2. Yet the distinction is as necessary in one case as in the other. The argument that 2 is mental requires that 2 should be essentially an existent. But in that case, it would be particular, and it would be impossible for 2 to be in two minds, or in one mind at two times. Thus 2 must be in any case an entity, which will have being even if it is in no mind.[1] But further, there are reasons for denying that 2 is created by the thought which thinks it. For, in this case, there could never be two thoughts until some one thought so; hence what the person so thinking supposed to be two thoughts would not have been two, and the opinion, when it did arise, would be erroneous. And applying the same doctrine to 1, there cannot be one thought until some one thinks so. Hence Adam's first thought must have been concerned with the number 1; for not a single thought could precede this thought. In short, all knowledge must be recognition, on pain of being mere delusion; Arithmetic must be discovered in just the same sense in which Columbus discovered the West Indies, and we no more create numbers than he created the Indians. The number 2 is not purely mental, but is an entity which may be thought *of*. Whatever can be thought of has being, and its being is a precondition, not a result, of its being thought of. As regards the existence of an object of thought, however, nothing can be inferred from the fact of its being thought of, since it certainly does not exist in the thought which

[1] *Cf.* Frege, *Grundgesetze der Arithmetik*, p. xviii.

thinks of it. Hence, finally, no special kind of being belongs to the objects of our presentations as such. With this conclusion, Lotze's second argument is disposed of.

(3) Lotze's third argument has been a great favourite, ever since Leibniz introduced it. All points, we are told, are exactly alike, and therefore any two must have the same mutual relation as any other two; yet their mutual distances must differ, and even, according to Lotze (though in this he is mistaken), the relation of every pair must be peculiar to that pair. This argument will be found to depend again upon the subject-predicate logic which we have already examined. To be exactly alike can only mean—as in Leibniz's Identity of Indiscernibles—not to have different predicates. But when once it is recognised that there is no essential distinction between subjects and predicates, it is seen that any two simple terms simply differ immediately—they are two, and this is the sum-total of their differences. Complex terms, it is true, have differences which can be revealed by analysis. The constituents of the one may be A, B, C, D, while those of the other are A, E, F, G. But the differences of B, C, D from E, F, G are still immediate differences, and immediate differences must be the source of all mediate differences. Indeed it is a sheer logical error to suppose that, if there were an ultimate distinction between subjects and predicates, subjects could be distinguished by differences of predicates. For before two subjects can differ as to predicates, they must already be two; and thus the immediate diversity is prior to that obtained from diversity of predicates. Again two terms cannot be distinguished in the first instance by difference of relation to other terms; for difference of relation presupposes two distinct terms, and cannot therefore be the ground of their distinctness. Thus if there is to be any diversity at all, there must be immediate diversity, and this kind belongs to points.

Again points have also the subsequent kind of diversity consisting in difference of relation. They differ not only, as Lotze urges, in their relations to each other, but also in their relations to the objects in them. Thus they seem to be in the same position as colours, sounds, or smells. Two colours, or two simple smells, have no intrinsic difference save immediate diversity, but have, like points, different relations to other terms.

Wherein, then, lies the plausibility of the notion that all points are exactly alike? This notion is, I believe, a psychological illusion, due to the fact that we cannot remember a point, so as to know it when we meet it again. Among

simultaneously presented points it is easy to distinguish; but though we are perpetually moving, and thus being brought among new points, we are quite unable to detect this fact by our senses, and we recognise places only by the objects they contain. But this seems to be a mere blindness on our parts—there is no difficulty, so far as I can see, in supposing an immediate difference between points, as between colours, but a difference which our senses are not constructed to be aware of. Let us take an analogy: Suppose a man with a very bad memory for faces: he would be able to know, at any moment, whether he saw one face or many, but he would not be aware whether he had ever seen any of the faces before. Thus he might be led to define people by the rooms in which he saw them, and to suppose it self-contradictory that new people should come to his lectures, or old people cease to do so. In the latter point, at least, it will be admitted by lecturers that he would be mistaken. And as with faces, so with points—inability to recognise them must be attributed, not to the absence of individuality, but merely to our incapacity.

(4) Lotze's fourth argument is an endeavour to effect a *reductio ad absurdum*, by proving that, on the absolute theory, points must interact. The being of every point, Lotze contends, must consist in the fact that it distinguishes itself from every other, and takes up an invariable position relatively to every other. Many fallacies are contained in this argument. In the first place, there is what may be called the ratiocinator's fallacy, which consists in supposing that everything has to be explained by showing that it is something else. Thus the being of a point, for Lotze, must be found in its difference from other points, while, as a matter of fact, its being is simply its being. So far from being explained by something else, the being of a point is presupposed in all other propositions about it, as, *e.g.*, in the proposition that the point differs from other points. Again, the phrase that the point distinguishes *itself* from all other points seems to be designed to imply some kind of self-assertion, as though the point would not be different unless it chose to differ. This suggestion helps out the conclusion, that the relations between points are in reality a form of interaction. Lotze, believing as he does that activity is essential to existence, is unable to imagine any other relation between existents than that of interaction. How hopelessly inapplicable such a view is, will appear from an analysis of interaction. Interaction is an enormously complex notion, presupposing a host of other relations, and involving, in its usual form, the distinction of

a thing from its qualities—a distinction dependent on the subject-predicate logic already criticised. Interaction, to begin with, is either the simultaneous action of A on B and B on A, or the action of the present states of A and B conjointly on their states at the next instant. In either case it implies action. Action generally may be defined as a causal relation between one or more states of one or more things at the present instant and one or more states of the same or different things at the next instant. When there is only one thing in both cases, the action is immanent if the thing be the same in cause and effect, transient if the cause be in one thing and the effect in another. In order to speak of action, rather than causality simply, it is necessary to suppose things enduring for a certain time, and having changing states. Thus the notion of interaction presupposes the following relations: (1) diversity between things; (2) diversity between the states of things; (3) simultaneity; (4) succession; (5) causality; (6) the relation of a thing to its states. This notion, involving, as a moment's inspection shows, six simpler relations in its analysis, is supposed to be *the* fundamental relation! No wonder absurdities are produced by such a supposition. But the absurdities belong to Lotze, not to space. To reduce the relations of points to interactions, on the ground that interaction is the type of all relations, is to display a complete incapacity in the simplest problems of analysis. The relations of points are not interactions, any more than before and after, or diversity, or greater and less, are interactions. They are eternal relations of entities, like the relation of 1 to 2 or of interaction itself to causality. Points do not *assign* positions to each other, as though they were each other's pew-openers: they eternally have the relations which they have, just like all other entities. The whole argument, indeed, rests upon an absurd dogma, supported by a false and scholastic logic.

(5) The fifth argument seems to be designed to prove the Kantian apriority of space. There are, it says, necessary propositions concerning space, which show that the nature of space is not a "mere fact". We are intended to infer that space is an *a priori* intuition, and a psychological reason is given why we cannot imagine holes in space. The impossibility of holes is apparently what is called a necessity of thought. This argument again involves much purely logical discussion. Concerning necessities of thought, the Kantian theory seems to lead to the curious result that whatever we cannot help believing must be false. What we cannot help believing, in this case, is something as to

the nature of space, not as to the nature of our minds. The explanation offered is, that there is no space outside our minds; whence it is to be inferred that our unavoidable beliefs about space are all mistaken. Moreover we only push one stage farther back the region of "mere fact," for the constitution of our minds remains still a mere fact.

The theory of necessity urged by Kant, and adopted here by Lotze, appears radically vicious. Everything is in a sense a mere fact. A proposition is said to be proved when it is deduced from premisses; but the premisses, ultimately, and the rule of inference, have to be simply assumed. Thus any ultimate premiss is, in a certain sense, a mere fact. On the other hand, there seems to be no true proposition of which there is any sense in saying that it might have been false. One might as well say that redness might have been a taste and not a colour. What is true, is true; what is false, is false; and concerning fundamentals, there is nothing more to be said. The only logical meaning of necessity seems to be derived from implication. A proposition is more or less necessary according as the class of proposition implying it is greater or smaller.[1] In this sense the propositions of logic have the greatest necessity, and those of geometry have a high degree of necessity. But this sense of necessity yields no valid argument from our inability to imagine holes in space to the conclusion that there cannot really be any space at all except in our imaginations.

(6) The last argument may be shortly disposed of. If points be independent entities, Lotze argues—so I interpret him—that we can imagine a new point coming into existence. This point, then, must have the appropriate relations to other points. Either it creates the other points with the relations, or it merely creates the relations to already existing points. Now it must be allowed that, if there be real points, it is not self-contradictory to suppose some of them non-existent. But strictly speaking, no single proposition whatever is self-contradictory. The nearest approach would be "No proposition is true," since this implies its own truth. But even here, it is not strictly self-contradictory to deny the implication. Everywhere we come upon propositions accepted because they are self-evident, and for no other reason: the law of contradiction itself is such a proposition. The mutual implication of all the points of space seems to be another; the denial of some only among points is rejected

[1] *Cf.* G. E. Moore, "Necessity," MIND, N. S., No. 35.

for the same reason as the assertion that such and such a proposition is both true and false, namely, because both are obviously untrue. But if, *per impossibile*, a point previously missing were to come into existence, it would not create new points, but would have the appropriate relations to already existing points. The point, in fact, would have already had being, and as an entity would have eternally had to other points the same relations as it has when it comes into existence. Thus Lotze's argument on this, as on other points, depends upon a faulty logic, and is easily met by more correct views as to the nature of judgment.

I have not criticised in detail the current arguments against absolute time, as they are all included under those against space. In favour of absolute space, in addition to the paradoxes of the relational theory, I have to urge the very much greater simplicity of the absolute theory. This appears most plainly in the case of motion. On the relational theory, it is essential to a motion to specify all the changes of distance and angle with respect to all other particles in the universe, since all combinations are possible, and no reason exists for preferring one distance to another. But on the absolute theory, we have merely one change of relation: the particle, which was *at* one point, is now *at* another. The geometrical relations hold primarily between points, and only by correlation between particles. Thus geometrical propositions become timeless, and motion is infinitely simplified. I cannot persuade myself that there is anything to set against this except an antiquated logic, not re-examined in its fundamentals, and capable, if I am not mistaken, of an easy and simple refutation.

II.—THE NATURE OF SELF-KNOWLEDGE.

By S. H. Mellone.

"It is evident," observes Mr. F. H. Bradley, "that both practical and theoretical knowledge of the human mind is possessed by those who are not metaphysicians." It is also possessed by those who are not psychologists, inasmuch as they know nothing of psychology as a science. The General Nature of Self-knowledge is the problem of this paper.

§ 1. This inquiry is not the same as an attempt to explain knowledge by something else. The self-contradictory character of such a task would be generally recognised at present. But self-knowledge is a relation involved in the essential nature of Intelligence, and hence its place in the organic structure of Intelligence can be analysed without self-contradiction. To insist merely that such a relation is "unique" and "unanalysable" would be futile. A sound maxim has been laid down by one of our modern writers: Whenever we find a "mystery" we are making an assumption; and it is our duty to probe the assumption to the bottom, before we fall down to worship the mystery.

No philosophical issue is of more fundamental importance than the problem of self-knowledge. It pertains to the root of every discussion as to the means by which the psychologist *arrives at the facts* which he is to explain. And again, it underlies such discussions as arise out of Mr. Bradley's and Prof. Münsterberg's recent contributions to the problem of the relation between truth in psychology and truth in reality.[1] Yet, fundamental as these issues are, to discuss the question of self-knowledge as though it had no existence outside their limits would be a serious mistake; and there is reason to fear that its importance is frequently missed because its different forms have not been brought together. Thus we find self-consciousness treated as a process of the "natural

[1] F. H. Bradley, "Defence of Phenomenalism in Psychology," Mind, No. 33; H. Münsterberg, "Psychology and Life" (*cf.* R. B. Haldane in Mind, No. 34).

history of the individual mind," which is nothing more than a problem *for* psychology; while among the inevitable *prolegomena* to psychology, there is a perpetual lawsuit as to the method and limits of psychological knowledge, which is only another form of self-consciousness. Again, the Kantian "transcendental logic" is said to be a "complete analysis of self-consciousness, and the systematic evolution of all that is contained in the very notion of self-consciousness," while finally in some forms of philosophical theory we find self-consciousness treated as "consciousness of the Unity of the Universe". And none of these meanings of the term will cover the widely diffused knowledge of mind which has originated independently of psychology and philosophy as special studies.

The term "self-knowledge" is used in the present paper so as to include all that professes to be knowledge of some form of our inner life and has been founded on direct analysis thereof,—however concrete or abstract may be the terms in which it is expressed,—whether it is some one's statement of a personal characteristic of his own, or an intelligent "knowledge of human nature," or a psychological, logical, or philosophical generalisation. Self-knowledge is a fundamental function of our intelligence; and one and the same principle runs through and determines all its forms and degrees.

It will be useful to distinguish first a theory of self-knowledge which perhaps has not often been consciously held, but which is implied in many views and theories of the subject which have been widely supported.

The traditional account of knowledge recognises that it is always a relation or reference, involving a duality or distinction between the respective loci of the knowing and the known. That this is sound in principle is not to be denied; but a favourite way of describing the distinction is calculated to lead only to confusion. Knowledge, it is said, necessarily involves a duality of terms in the form of Subject knowing and Object known. Then in the case of self-knowledge there creeps in the assumption that knowledge is analogous to a light proceeding from the Subject and shed on the Object; the Subject is like an eye that is itself the source of the light by which it sees, and the knowing is like the seeing. This I will call the "eye-theory" of self-knowledge; and it may be worked out in different ways.

(*a*) It combines readily with another favourite doctrine: that we must make a sharp distinction between the "pure" and the "empirical" self; or, in other words, between the

mental *phenomena*, the changing temporal states, and the mental *noumenon*, the permanent substance or substratum "underlying" them. In the case of self-knowledge, the *noumenon* is the Subject which knows, the *phenomena* are the psychological objects known. Then the question arises, how can the Subject, as such, know itself? The reader will remember that Mr. H. Spencer, among many others, has vigorously contended for the *existence* of such a Subject as a necessary assumption. Combine with this the assumption that "the fundamental condition of all knowledge is the antithesis of Subject and Object," and we have the natural conclusion that the Subject, though it may know its phenomena to any extent, can never know itself: "The mental act in which self is known implies, like every other mental act, a perceiving Subject and an Object perceived. If then the Object perceived is Self, what is the Subject that perceives? Or if it be the true self which thinks, what other self can be thought of? Clearly the true cognisance of self implies a state in which the knowing and the known are one, in which Subject and Object are identified; and this is the annihilation of both. So that the personality of which each is conscious, and of which the existence is to each a fact beyond all others most certain, is yet a thing which cannot be known at all: knowledge of it is forbidden by the very nature of thought."

Two ways of avoiding this difficulty have been occasionally suggested. One is, to assume that Subject and Object are really identical in self-knowledge. This I suppose is the ordinary expression of the intuitional view, that the soul simply knows itself to exist. But what meaning can "the *identity* of subject and object" have in this connexion? Apparently its only meaning can be to obliterate the relation or reference which is essential in all knowledge. So far, Spencer's rejection of it is justified. The other resource is to affirm that the Subject is known by inference. If so, it must be a postulate to account for changes in the field of psychological objects. But if our knowledge of it is only inferential or mediate, we could never know *what* to assume in order to account for these subjectively-initiated changes. How could we even conceive or think about self or any of its activities without some basis of immediate experience to account for the conception? Mr. Spencer saw this, and expressed it in a well-known passage which I will quote because it sets forth a fundamental truth with regard to the element of immediacy in all conscious experience: "In each mental act there is an element which persists. But the

persistence of this element under successive conditions necessitates the sense of it as distinguished from the conditions and independent of them. That which is common to all states of consciousness and cannot be got rid of, is what we predicate by the term existence. . . . There remains an indefinite consciousness of something common under all modes —of being apart from its appearances. . . . Our consciousness of the unconditioned being literally the unconditioned consciousness or raw material of thought, to which we in thinking give definite forms, it follows that an ever-present sense of real existence is the very basis of our intelligence. As we can in successive mental acts get rid of all particular conditions and replace them by others, but cannot get rid of that undifferentiated substance of consciousness which is *conditioned anew* in every thought, there ever remains a sense of that which exists persistently and independently of conditions, . . . an indefinite consciousness of an absolute reality transcending relations."[1] We have here a recognition of the same truth which has been elaborated in Mr. Bradley's doctrine of Feeling, and Mr. Stout's distinction of "noetic" and "anoetic" consciousness. At present we note its particular implication, that we could never *infer* the existence of the Ego or any function of the Ego, such as Freedom, Volition, or pure Feeling, if that which we infer were not already present in consciousness but undiscriminated,— present by way of *experience*, immediate but not yet defined.

Both these attempts to remove the difficulty referred to by Spencer are, therefore, ineffective; but the difficulty is a fictitious one, for, as we shall see, the distinction of Subject and Object affords an altogether inadequate statement of the problem of self-knowledge. The perplexities that ensue are of our own making, and ought to be taken as a *reductio ad absurdum* of the "eye-theory".

(*b*) The theory may of course be held apart from any agnostic bias. It assumes that introspection is essentially a certain direction of the attention, and may be compared to a direct inspection of the contents of consciousness. The latter are, therefore, the objects of psychological knowledge.[2] This is the traditional view in Psychology. But it is so unnecessary and so indefensible that it can scarcely be allowed even the relative validity of a working assumption.

[1] With the doctrine that thought by "conditioning" an object renders it "unknowable," we have of course nothing to do.

[2] When we assume that all of what introspection reveals must belong to these contents, as elements in them or aspects of them, then we have what has been called the bias of "Presentationism".

Its main defects may be expressed in various ways. It assumes psychological knowledge to be absolutely different in kind from all other knowledge. Without parallel in the world of knowledge is this process by which the contents of mind unroll themselves before the "inner eye," as soon as this mysterious organ turns its attention to them. More pregnantly expressed, our charge is that the theory separates the knowing from the known so that the connexion becomes a merely external one; the knowing becomes a formal process with no essential relation to what is known. And as it is the merely individual and merely finite sides of the mind, with the elements composing it, which are thus "observed," this theory prepares the way for mechanical and atomistic theories in Psychology, logic, and ethics. Everything which, on this merely external view which is miscalled elf-observation, appears to exist independently, is forthwith treated as a positive self-contained existence. The initial principle is the same whether the outcome be sensationalism or intuitionalism,—whether the isolated elements disclosed by "turning the mental eye inwards" are the particular "sensations" out of which the mind is supposed to be built up, or the particular "immediate perceptions" which are supposed to lie at the basis of logic and ethics.

(*c*) But the most fatal defect in this "eye-theory" remains to be noticed. On inspecting the contents of the mind we are supposed to see what is there and how it is arranged. The implication is that the *ultimate truth* can be attained by sufficiently careful observation, and that any act of self-knowledge has the highest kind of certainty and is valid in its own right. And since, again, the self whose processes are thus known with perfect accuracy is the individual self *as finite*, it is difficult to exaggerate the importance of the results to which this error leads. For it has a "counter-implication"; what we clearly and distinctly observe within us, is simply true, without qualification, and what we do not or cannot thus observe, is simply not true. It may be objected that this is the view of Common Sense: and it is so, in part. But Common Sense is before all things practical; it holds that a man may know his own mental life sufficiently for practical purposes, and it adds the important qualification that "self-deception" is extremely easy. This means simply that a man's ideas of his own inner life (particularly his desires, character and plans) may be partly illusory. From another point of view it may be objected that no one ever denied so obvious a fact. But principles which are not

denied in theory may be ignored in practical psychological investigation and discussion. For example, a theory may be quite defensible if understood as a reasonable, yet provisional, interpretation of certain complex psychological facts ; reasonable, because it is the best interpretation that we can arrive at, yet provisional, because it is evidently incomplete compared with the facts as a whole, and lacks internal coherence. But we find that in many cases such a theory is attacked and defended as though it claimed to be the ultimate truth. The whole controversy regarding Liberty and Necessity has, I believe, been of this kind.[1] Incidentally, also, the foregoing considerations show why the old-fashioned " appeal to consciousness " in this and other similar vexed questions is so futile. To say " let consciousness decide " is idle, when in each case the whole complexity of the problem lies in the *interpretation* of consciousness

§ 2. Let us now bring together the positive implications of the preceding critical remarks.

Both in psychology and metaphysics we must reject the notion of a " pure " or " transcendental " self. And the notion of an " empirical " self must go along with it, for the one is only conceived in antithesis to the other. The real self is that which is known and realised or lived in and through the actual process of conscious life. It is essentially manifested in this its content; its individual existence consists in gradually organising itself in certain explicit, definite forms. Hence if we use such terms as *Noumenon* and *Phenomena*, Reality and Appearances, we must say that the former is known *through* the latter and can be known in no other way. Similarly, with regard to the relation of Subject and Object; to say that for knowledge there must always be a Subject of knowledge, means that thought or knowledge exists only as the thought of a thinker, —it is always an activity, " an activo-passive experience of an individual subject " ; and to say that for knowledge there must be an object of knowledge, means that knowledge is always a reference beyond its actual place of appearance as the conscious function of a finite personality. Is it not of the essence of knowledge to be representative or symbolic of something whose existence transcends it,—something which is in a sense " other " or " more " than the knowledge itself? And what is referred to or known cannot be identi-

[1] That is to say: all that we can ask for is this—what is the least inappropriate and incoherent interpretation of the *fact* of Freedom? Upon the fact, as such, all but materialists are agreed.

fied with the process of reference, the knowledge itself. But all knowledge is *direct* in this sense—that it refers directly to the reality known, the object referred to; and not indirectly through some substitute intervening between this and the knower. When a man reflects on his own states, and when he reflects on something in the objective world—*e.g.*, the motives of another man's conduct, or the nature of a chemical combination—his attitude to the "object" is the same; the reference is equally direct, though the knowledge is necessarily imperfect, and may in some of its details be illusory.

On this general question of the validity of self-knowledge, we may say with Prof. Adamson: "Nothing is gained, as regards accuracy of observation, by the 'intra-subjective' character of both the observed and the observation. . . . If to know the processes of consciousness means to be able to determine accurately their characteristics and differences, I should be inclined to say that we can hardly claim such knowledge. What we do possess is painfully and laboriously attained, and wants every mark of 'immediate certainty' or 'absolutely self-evidencing' character. . . . I can be, in and through the process of knowing, no more certain of what is *in my* consciousness—if we allow for the moment that any definite meaning can be put into so metaphorical an expression—than of what is beyond my consciousness. That knowing is a process of mind, and that the known is in the one case likewise a fact of mind, lends no additional certainty to the resulting cognition."[1] And as in all knowledge, so in observation of the inner life; "the thoughts whereby we determine the nature of the observed are neither in fact nor in meaning identical with the observed".[2] This is evident because in observing some fact of our inner life we do not *isolate it;* the reflexion consists in relating it in manifold ways, according to the interest of the moment; the most fundamental being its relation to the idea of self—it is at least a mode of *my* mental life. And to identify all these relations with the thought of them as I observe the fact in question, would be absurd. Self-knowledge, therefore, also involves a reference. But though this reference is direct, it is indefinite and incomplete.

This is the primary implication of the view which is here defended. No conception which we can form of the constitution of the mind or of any factor therein can be an

[1] MIND, vol. xii., p. 126.
[2] On this point *cf.* also Stout, *Analytic Psychology*, i., 44.

adequate representation of the reality; we cannot adequately state in intellectual terms the nature of our inner experiences. This does not mean merely that we do not know all that we are; it is true of every piece of self-conscious reflexion in common life, and of psychological analysis both general and detailed. All the results so obtained are relative to the present state of our knowledge; they are necessarily held subject to a revision which may have to be so thorough as completely to transform them, and each in itself has many missing links of connexion, and exhibits a general want of satisfactory coherence. But such conceptions are not therefore false; we must accept them if they are the best account which we can now form of the realities to which they refer. The more complete truth does not destroy the less complete, but expands and transforms it. Truth is like a picture of boundless extent and infinite detail, which is obliterated for us and needs to be renewed, and of which we have only recovered different disconnected portions, and these only in vaguest outline. These portions can only be correctly estimated when they are treated as such; they are fragments *of the whole* and not illusions; but they are *fragments* of the whole, and not self-contained pieces of truth, each of which can stand on its own merits. These conclusions as to self-knowledge seem to follow necessarily from the very conception of truth as an organic whole; but they need to be applied to the detailed theories of psychology.

One of the chief causes of the difficulty in arriving at satisfactory inductions in psychology is, of course, that the facts are immediately accessible to one observer only; and in order to serve more than a private purpose, in order to have any scientific value, it is indispensable to raise the result of self-knowledge from an individual to a general fact. But the difficulty must not be put in the wrong place. As we are no longer ruled by Mill's *Logic*, I suppose it will not be denied that in Induction a single case, *examined with sufficient care*, can establish a universal law. The ideal of this principle of induction is seen in Geometrical reasoning. For example, to prove that "the three interior angles of any triangle are together equal to two right angles," I must have a "figure" before me, actually or in imagination: that is, I must have recourse to the perception of a particular case. This case may be that of an isosceles right-angled triangle with sides and angles of fixed magnitude. But when the conclusion is established by consideration of this case alone, I may be sure that it holds of every other triangle, because in the proof I have considered only the essentials

of the case, and have not referred to the above-mentioned particulars, nor to anything but what is stated in the definition of a triangle. In Geometry we may be certain that our investigation is sufficiently thorough—in other words, that it is based only on the essentials of the particular case with which we work—because we frame our own definition of what these essentials are. But in physical or psychological investigations, we have to *discover* the essentials; hence the inductive conclusion suggested by any one instance has to be carefully verified, or tested, and perhaps corrected, by many other instances. Still, it is only the difficulties or defects of our own investigation which prevent any one case from establishing a reliable universal; while it is a constant occurrence that one case may *suggest* the universal. Hence, although "every mental state is by hypothesis observable, introspectively, by one observer only,"[1] it may perfectly well suggest a universal law of mind. That introspection, by itself, will do more than suggest a possible law, is very unlikely, for as we have seen it is beset with innumerable possibilities of error. Hence the scientific psychologist has to verify the results of his introspective observations by "appeals to language, to pathology, to childhood, to mankind in general". These objective expressions of mental life, to which he refers, would have no meaning for him, were it not for his previous introspective inductions, which give him the only key of interpretation. He is interested in such social facts as manifestations of mental states like to those upon which he has been reflecting; as such alone, not as "psycho-physical complexes,"[2] he appeals to them. He is no more concerned with the fact that they are mediated to his reflexion by means of physiological processes, than the student of a book is concerned with the operations of writing, printing, etc., which have made him aware of the author's thought.[3] On the other hand, as we observed, the fact that the comparison and verification of the results of self-knowledge are thus indirect, adds to the difficulty of arriving at satisfactory inductions.

What, it may be asked, is the practical consequence of this conclusion? Is it simply to throw doubt upon all varieties of self-knowledge, by viewing them as infected with error to some undefined extent? This would indeed be futile. For practical life, its consequences are numerous and

[1] See Prof. Royce's observations in MIND, No. 23, pp. 388-90.

[2] On the other side see Royce, *ibid.*, p. 391.

[3] Certain special exceptions which might be mentioned do not disprove this rule.

important; because the number of beliefs which are held, or denied, on the ground of appeals to "inner experiences" and "feelings," is not small. For psychology and philosophy, its chief consequence is this. Conclusions which will work if taken as containing truth in solution, as it were—or, as we may otherwise express it, which are symbolically true —become unworkable and even self-contradictory if taken as absolutely true. Criticism of any theory may be perfectly valid in the latter view of its truth, and yet be worthless in the former view of it, because an entirely wrong standard is employed. In psychology the standard of perfect coherence and clearness is an impossible one, and all criticism which implies it is a mere irrelevancy. If we insist upon attaining it, we do so at the cost of overlooking the complexity of mental life, and perhaps of doing violence to some of its essential features.

§ 3. That self-consciousness is a mode of knowledge which, like all knowledge, must have *degrees of truth*—is a brief and familiar way of stating the conclusion at which we have arrived. But its significance cannot be properly estimated apart from a closely related conception, with which indeed the former stands or falls. I mean the fundamental distinction and correlation (in all intelligible experience) of Thought with the element of Immediacy, which Mr. Bradley has called Feeling (after Hegel's *Gefühl*), and which Mr. Stout has called "anoetic consciousness". We must note carefully the implications of this conception in order to connect it with the question of self-knowledge. (*a*) The whole process of growth in our knowledge of the world points back to a sensuous *ἄπειρον*, which is the basis of external perception; knowledge begins with the definite articulation of this into intelligible fact. Sentience, so understood, is not a chaos of *data* received from a foreign agency; and it is not an absolutely homogeneous state of feeling; it contains *variations* which succeed one another in a regular order—"felt differences" which are not a chaos. Hence, as thought develops, it becomes possible for intellectual distinctions to supervene upon these felt differences; and not until this begins can knowledge and intelligent experience begin. (*b*) If we try to conceive a *purely* anoetic consciousness, as such, we can only think of it as a limit which may be gradually approached. In this limit there would still be "diverse aspects," though "not yet broken up into terms and relations"; some of these would be "features of what later becomes the environment," and would be indivisibly one with "the features of what later

becomes the self". (*c*) Self-knowledge involves the same element of immediate experience, which, as such, is not the knowledge in question, but on the basis of which alone is the knowledge possible. This distinction of anoetic and noetic consciousness has great significance at every stage of mental growth, though doubtless it is first suggested by the contrast of the earliest with the later stages. It means that not only in the beginning, but at every stage, there are whole regions of mental life which, though they may be truly said to be present *in* consciousness, are not present *to* consciousness in the sense of being *known*, *i.e.*, intellectually discriminated and interpreted; but they may largely determine the character and contents of those regions of mental life which are known. Our self-knowledge grows in depth and truth whenever something more of what is present in consciousness becomes not only present in, but present to, consciousness. This, then, is the fundamental principle running through all forms of self-knowledge. We express it in very simple language. Before any fact can be known to any extent, or *thought* about, in the proper sense of the word, it must be felt; in the one case the feeling is there, but is not thought about, or only vaguely thought about; in the other case, the feeling is still there, but thought has begun to grasp and construct its meaning.[1] Our capacity for higher insight and knowledge grows as we pass from the former state into the latter.

Thus self-consciousness may be the most superficial or the most fundamental mode of knowledge, according to the degree of truth which we understand it to have attained. It is the result of the self-transcending tendency of thought through which thought always refers beyond itself. If we have regard only to that degree of truth which is necessary for the practical and theoretical purposes of everyday life and of physical science, we may say that this "reference beyond" is in two directions. By the "outer" direction of its intelligence the conscious self conceives (or is capable of conceiving) of the world as a whole with its dependent parts; by the "inner" direction of its intelligence it conceives of itself as an individual centre, having the unity of a personal life which is more than knowledge. Common Sense adopts a point of view

[1] From this principle it follows naturally that in the case of psychological analysis, we do not and can not analyse what is discriminated, or what is *present to* consciousness; but our thought reconstructs what *was present but undistinguished in* consciousness or in the results of previous analysis or discrimination. *Cf.* Stout, *Analytic Psychology*, vol. i., pp. 52-61.

from which this distinction of the "inner" and "outer" directions is regarded as practically ultimate. But analysis need not go far to show that it is a metaphor with only a limited applicability. Self-consciousness *includes* an awareness of the processes in us by which our consciousness of a world is realised and extended; or rather, it is capable in its higher degrees of including this awareness, but always includes fragments of it. When thus developed self-consciousness brings to light the fundamental presuppositions and ultimate ideals of physical knowledge (*e.g.*, the world as a systematic unity—within which general laws obtain). Similarly, by reflexion on the ethical and æsthetic consciousness (and its actual achievements), ideals of Goodness and of Beauty are brought to light. Whether we regard self-consciousness, when fundamentally developed, as finite or not, depends on considerations arising out of a general metaphysical position; but if we conclude that the human self has a finite and infinite side, then self-conscious is merely finite only in so far as we have not learnt to know the real constitution of our nature. The principle is throughout the same; there is always the general background of sentience, out of which arises thought itself and the experience which thought makes intelligible, and in this intellectual formulation of what was previously undistinguished, the process of knowledge consists.

§ 4. These conclusions may now be applied to certain questions affecting the position of Psychology as a science. I will take these questions in the form in which they are set forth in Mr. Bradley's suggestive and thorough-going "Defence of Phenomenalism in Psychology". I do not write as a mere critic of what is said in that paper, for I have been glad to find that, in what seem to be the most essential points, the views which I have been trying to defend are in harmony with those of Mr. Bradley. And it is clear that by "Phenomenalism" Mr. Bradley means something very different from what Prof. Seth, Prof. Ward and others have attacked as "Presentationism". The essence of this theory or method, as I conceive it, is to reduce all the contents of mind to complications of atomic sensations; the only function of the mind being sensation characterised by quality, intensity, and tone of feeling. No one thinks of denying that the subject may be thus treated when approached from the point of view of Physiology and of Psycho-physical Experiment; but such a procedure gives only a useful fragment of Psychology, and not the whole of it. What we protest against is the assumption that the

only "scientific" and non-metaphysical treatment must be of this kind. And I cannot see how this assumption can be dismissed as a "gross error," as "exploded in principle," as "a thing with which one need hardly trouble oneself," [1] when it is openly made and defended by some of the foremost psychologists of the day. Hence it seems to need and to deserve more careful examination than Mr. Bradley is willing to give it.[2]

The points raised by Mr. Bradley, on which I should like to remark, are these: the correlation of the known with the experienced; the principle by which Psychology is to be separated from Metaphysics; and the validity of the "General Analysis of Mind".[3]

(*a*) Remembering that experience includes anoetic consciousness, which is present in every stage of mental life, and present most of all in our consciousness of Ideals, we must give an unqualified adhesion to the fundamental view that if anything is eliminated from the *experienced* world it is in fact banished from the world altogether: for there is no other world in which it could exist.[4] Hence not only Pleasure-pain, Will, and Self, but also Reason, our highest rational Ideals, and the Absolute itself must be experienced if they are known. Mr. Bradley refers (p. 38) to a view that Self and its activities, including Pleasure-pain, "is not itself perceived, and does not itself enter into the experienced content, and is not and cannot itself be made into an object". If this means, strictly and literally, that it cannot be experienced, then such a view is "a thing with which one need hardly trouble oneself". But the statement that the Self "cannot be made into a psychological object," contains a subtle ambiguity, which requires mention, as such statements are frequently met with.[5] Psychology is not bound, and as a particular science is not able, to discuss the ultimate nature of the Self, the Will, etc.; but if it is to

[1] MIND, No. 33, p. 37.

[2] *Cf. Studies in Philosophical Criticism and Construction*, ch. iv., pp. 209-224. As Mr. Bradley has referred to this book, I will say here that in ch. v., which deals with the question of Self-knowledge, the problem now seems to me to have been imperfectly stated and wrongly approached.

[3] *Philosophical Criticism*, pp. 46, 58, 109.

[4] MIND, No. 33, p. 41.

[5] *Cf.* for example some of the views referred to by Mr. Haldane: "An absolutely final Subject . . . never itself capable of presentation as an object within experience"; "an activity that lies beyond experience and is determinable only as that which makes experience possible"; "the will as such . . . can never itself be an object in experience,—is not cognisable by psychological methods" (MIND, No. 34, pp. 206, 208, 210).

exist at all it must know something about them. And so far as Psychology knows anything about such factors of mental life, those aspects which it knows are "objects before the mind". If again we are able in metaphysics to revise and extend the partial, limited knowledge of Psychology, all that we do is to determine the object more truly. To be made an object in experience means to be discriminated and known; hence, with Mr. Bradley, we reject as unmeaning the doctrine that anything is *never* itself capable of presentation as an object within experience. On the other hand, that which is known is never identical with the knowing; hence, in this secondary sense, we have to affirm the doctrine that nothing is ever itself capable of being presented within experience as an object identical with the knowledge of it. And closely connected with this use of the term in question, is the view to which we shall have to refer immediately (*c*),—that Pleasure-pain and Conation are not merely elements or aspects of Presentation. This is what is usually meant by saying that they cannot be made into "objects".

(*b*) I regret to have to refer to the unprofitable and over-discussed question of the relation of Psychology to Metaphysics. Happily, Mr. Bradley has stated it in a fresh and pregnant form. He looks for a "clear principle" of division between the two, and finds it in this—that Psychology is confined to *phenomena* and the *laws* of phenomena; and, "since Psychology is not concerned with more than this, it is at liberty to use fictions, and the question of truth is not to be raised in it except so far as truth means whatever serves best to explain the course" of mere phenomena: the *course* of phenomena being strictly limited to their co-existence and sequence. But, whether the fault lie in myself or not, I am unable to see how this provides the *clear principle* which is desired. For in this view of the limits of Psychology, the conception of *phenomenon* is of fundamental importance; and, from the nature of the case, it must be a fluid conception,—apart from the restriction that "it is not for the purpose in hand taken as anything more than an adjective happening to and qualifying a particular soul" (p. 28), which, as Mr. Bradley says, is not by itself sufficient to exclude metaphysical questions (p. 27). What is a phenomenon? It is immediately experienced (p. 28); and "what is experienced is a whole with certain aspects which can be distinguished, but as so distinguished are abstractions" (p. 36); but "phenomena are not all perceptions, they are not all objects given to a self, they do not all come before the mind" (p. 37). In other words, they

are aspects of the experienced, which includes *feeling*. And feeling includes as much as can be discovered in it. Of course the previously undistinguished aspects of feeling become objects, but their extent must be left indefinite. For feeling is not limited to the "cœnæsthesia," which is present while life lasts; it is implied in mental analysis at every level,—as much in the analysis of thought itself by thought as in any other. In fact, "phenomena" in this sense are properly defined as fragments or partial aspects considered apart from the whole reality to which they belong: everything is therefore a phenomenon which falls short of the whole Truth and Reality, and this is most clearly true of all our psychological knowledge. But I cannot see how this fundamental truth can be so used as to give us a clear principle of division between Psychology and Metaphysics. Mr. Bradley's principle would be clear if phenomena were limited to objects, and then psychological phenomenalism would have close affinity with the metaphysical phenomenalism which he rejects. Phenomena would become, in both cases, facts which might be known to any extent without our knowing any more of the Reality of which they are phenomena. But is there the least affinity, as Mr. Bradley implies that there is (p. 26), between metaphysical phenomenalism, so understood, and the psychological phenomenalism which he defends? There are two fundamentally different conceptions of phenomena involved. In the latter case phenomena are partial aspects; and there is the closest relationship between phenomenalism in Psychology and in Metaphysics,—only that in the case of Psychology we are deliberately content to work with facts which are evidently fragments and with laws which are partly false, and in the case of Metaphysics we desire that our finite thought and will shall completely express the nature of Truth and Reality so far as it can be grasped by us *as a whole*. But as we know that the finite falls indefinitely far short of the Absolute, to that extent we are phenomenalists in Metaphysics.

Here I wish to suggest another question. Is there really much profit in discussing the division of *Psychology in general* from Metaphysics? It may be approached from the point of view of Physiology, Psycho-physical Experiment, Mental Pathology, Ethnology, Direct Analysis, and Genetic Explanation. We only need to raise the question of division from Metaphysics in the case of the last two of these branches; and the answer to it surely must depend as much on our conception of metaphysics and metaphysical method,

as it does on our conception of psychological method: but the method appropriate to Metaphysics can hardly be settled before we begin Psychology. And from the side of Psychology it seems impossible to find any principle which shall be theoretically satisfactory. In Metaphysics the explanations must be as true as we can make them,—the problems probed as deeply as possible. In Psychology, numerous questions, such as those mentioned by Mr. Bradley (p. 27), are deliberately excluded, not on any principle but by a practically necessary compromise. We see that as a matter of fact if Psychology raised such questions, it would commit suicide and be dissipated in Metaphysics,—it simply could not exist as a particular science. Experience shows which are the questions that Psychology can try to answer consistently with its own existence. For the rest it is in the interest of clear thinking not to stretch the separation of Psychology from Metaphysics, lest in the supposed non-metaphysical treatment certain metaphysical assumptions should be lurking unseen and so giving a subtle bias to "scientific" results. And it will not be denied that some problems proper to Analytic and even to Genetic Psychology may have important metaphysical and logical bearings.

(*c*) A large body of psychologists think that it is most convenient and also scientifically most useful to begin with a "general analysis of mind,"—a statement of the *typical form* of the psychologically complete mental function. Now it is a common experience that when a change takes place in our perceived environment, we are pleased or pained by the change, and we act accordingly. Hence it is affirmed that in the typical form of consciousness, we find a Subject (1) perceiving objects, (2) feeling the pleasure or pain which they excite, and (3) striving to them or away from them accordingly. The three-fold function thus consists in Intellection, Pleasure-pain, and Activity or Conation. It is also affirmed that Pleasure-pain and Conation are not simply elements *in* the presentation, so as to be constituent parts of it; they are not mere aspects of the presentation (as are quality and intensity); they are distinct enough from it to be thought as absent without the presentation disappearing with them. Mr. Bradley has criticised this view on the assumption that it regards Pleasure-pain and Conation as incapable of being experienced and as somehow known indirectly. If any one has ever held such an extravagant paradox, Mr. Bradley's crushing refutation of it is well deserved. What is maintained is that as a matter of experience consciousness means knowledge and more than

knowledge; and in this "more," we can as a matter of experience distinguish (*a*) a state of which the intensity appears in general to be conditioned by the presentations, and (*b*) one of which the intensity appears in general to condition the presentations.[1] Mr. Bradley contrasts this view with the one on which we have been dwelling above,—the implication of feeling, the anoetic element of immediacy, in all conscious life (pp. 40, 41); but to me they are so far from being inconsistent, that I could not maintain the former without the latter. When we assume that, in general, the Subject in being conscious of presentations is in a relation of activity and affection (pleasure or pain) to them, we are expressing in intellectual terms certain felt differences which pervade mental life. For this reason, and no other, I am able to estimate the significance of the expression which is adopted. Hence I cannot admit that either here or in the book to which Mr. Bradley refers, I have left a false view standing side by side with the true one, with which it is "radically discrepant" (p. 41). I maintain that there are no general grounds on which the relative validity of this General Analysis can be denied,[2] and that through a large part of the subject it will work. On the other hand, its limitations were fully recognised. It is only applicable where presentations have at least begun to be discriminated into distinct objects. We can prove to demonstration that it breaks down if applied to the beginning of consciousness in the order of time on the earth,[3] and to the ultimate Ideal of consciousness;[4] and as a matter of present fact, it will not work with those pleasures and pains whose exciting objects come nearest to being modes of anoetic consciousness.[5]

It is certain *a priori* that such limitations will pertain to any psychological theory, whether general or not. But this is no reason for its rejection, unless we have another theory to propose which is in itself logically more satisfactory,

[1] The term Subject is used to emphasise the individualised or centralised character of every consciousness, with its unity at every moment and its continuity through successive moments. To this Mr. Bradley finds no objection (p. 30). The Presentations are modes of noetic consciousness,—perceptions, mental images, ideas, memories, opinions, knowledges, and so forth. The Conation is normally guided by the pleasure or pain which these arouse, and they are its object. I find myself that I certainly do not attend to the pleasure-pain but to its object; and this is especially marked if in order to maintain a pleasure in consciousness, I seek to maintain its object and there is difficulty in doing so.

[2] The general grounds on which it may be defended were fully set forth in *Philosophical Criticism*, ch. iv.

[3] *Ibid.*, ch. v., p. 275 ff.

[4] *Ibid.*, ch. vii., p. 374 ff.

[5] *Ibid.*, pp. 202, 203, 239 ff.

which has more explaining power over such *cruces* of psychology as are the problems of Emotion, Belief, Desire, Attention, Association, and above all, which goes further towards enabling us to regard all forms of mental life as modes of one fundamental function or type.

I will add a note in conclusion on a point connected with our general subject. If there is an ultimate relation in experience, we cannot say that it is the relation of Presentation, which implies the stage of noetic consciousness. A fact is not presented to me until I have begun to think about it. But in beginning to think about it, I am entering the region of uncertainty and indefiniteness as well as of knowledge,—for it is the nature of knowledge to be a process of gradual differentiation in which one "fact" always implies others and no fact is self-contained. We cannot get back to any presentation which is free of this process of thought, or which is ultimate in the sense of being a solid rock on which we can stand and start. We must rather say that the fundamental relation in experience is "fact thought about". In speaking of "fact," we draw attention to the place of sentience in the growth of knowledge; while the thought about it implies on the one hand the background of sentience to be reconstructed, and on the other an Infinite Organism whose functions are the laws and ideals of the thinking.

III.—THE RELATION OF THE TWO PERIODS OF FICHTE'S PHILOSOPHY.

By Ellen Bliss Talbot.

The question of the relation between the earlier and the later form of Fichte's philosophy is one which has often been discussed and upon which widely different opinions have been held. Some maintain that in the later works we find a complete abandonment of the fundamental doctrines of the earlier, while others declare that there is no essential difference between the two periods. Where there is so great disagreement in a matter of interpretation, the natural inference is that the truth lies somewhere between the two extreme views. And with regard to the relation between the two phases of Fichte's philosophy, this seems to be the case. That there is a noticeable difference between the prevailing doctrines of the two periods seems clear; but that the difference is not so far-reaching as many have supposed, is equally evident.

In this brief study it will not be possible to consider all the differences—real or apparent—between the two periods. We shall have to confine ourselves to the most important phase of the question, namely, the relation between the conception of the ultimate principle which appears in the earlier works and that which is found in the later. In the first period Fichte speaks of his ultimate principle as the 'Ego,' the 'Idea of the Ego,' and occasionally as 'God'. In the second period he designates it as 'being,' 'God' or the 'Absolute'; and at the same time he uses the term 'knowing' or 'absolute knowing' in such a way that it seems to be simply another expression for the Ego of the first period. This suggests that the Ego, which seems in the earlier works to be regarded as ultimate, is represented in the later ones as depending upon a still higher principle; and if this be the case, then it seems that there must be a considerable difference between the two periods.

The close relation between the Ego of the first period and Kant's transcendental unity of apperception has often been

pointed out. Kant had shown that there is implicit in the consciousness of each individual a principle which is not itself individual, which is valid, not merely for this particular self-consciousness under these particular limitations of time and space, but for all self-consciousness which is like our own. On Kant's view, however, this transcendental apperception is set over against a world of independent reality. The thing-in-itself and the Ego-in-itself are two distinct principles; and their unity—if indeed they are ultimately a unity—is possible only through their common relation to something which is higher than either of them. But we can never know anything about this supreme unity,[1] the effort to do so would be simply an attempt to establish a system of metaphysics; and metaphysics, as the *Kritik der reinen Vernunft* teaches us, is impossible.

It is at this point that Fichte takes up the problem. He is by no means convinced of the impossibility of metaphysics. In fact it is one of his fundamental presuppositions that philosophy is possible. Now this means, in the first place, that underneath the seeming duality of our experience there is a unitary principle. But it means still more; for it is conceivable that there should be such an ultimate unity and yet that philosophy should be utterly impossible for us. If philosophy is to be a possibility, then it must be true, not only that there is a unitary principle, but also that we may have some sort of knowledge of it. It cannot be utterly inaccessible to human thinking; our own consciousness must give us the key to its nature.

Now when Fichte comes to analyse this consciousness, he finds, as Kant found before him, that it contains two principles—a formal and a material, a subjective and an objective. He finds too that these principles seem opposed, that the subject sets itself over against the object, regards the object as something foreign to it. This seeming opposition in consciousness it is the philosopher's task to overcome; how does Fichte propose to overcome it?

In the *Erste Einleitung* he tells us that all philosophical systems are reducible to two, which he designates respectively as dogmatism and idealism. Dogmatism takes as its principle of explanation the thing-in-itself—mere lifeless being—and seeks to deduce life and consciousness from it. Idealism takes as its principle intelligence or the Ego, which is an

[1] "Human cognition has two stems, sensibility and understanding, which perhaps spring from a common, but unknown root" (*Kr. d. r. V.*, A, 15).

activity. Neither of these two philosophical systems can directly refute the other. But idealism can indirectly refute the rival theory—and thus establish itself—by showing that the dogmatist fails to explain what he professes to explain. Dogmatism cannot bridge the "gulf . . . between things and thoughts (*Vorstellungen*); instead of an explanation it offers us a few empty words. . . . Dogmatism is therefore . . . not philosophy, but only a feeble affirmation and assertion. Idealism remains as the only possible philosophy."[1]

Fichte's principle of explanation then is the Ego. Now it is possible to take this 'Ego' in two different ways; namely, as pure subject (mere form) and as the unity of subject and object (of form and matter). The first interpretation is at least suggested by the discussion in the *Erste Einleitung* which we have just been considering. Consciousness itself contains two principles, a formal and a material. But its material principle is just that which leads us to postulate the existence of the thing-in-itself. Hence, when Fichte says that instead of trying to explain the Ego by the thing we should rather seek to explain the thing by the Ego, one can hardly be blamed for supposing him to mean that the subjective principle is the higher of the two and that the objective is a secondary manifestation of it. And if we interpret the *Wissenschaftslehre* in this way, it seems to be a thorough-going subjective idealism, in which all the material aspect of thought is regarded as mere *Schein*, while the former aspect alone is taken as ultimately real.

But this does not seem to be Fichte's meaning. Our key to the nature of the ultimate principle is consciousness in its *dual* aspect of subject and object. In experience we always find both form and matter, and it is impossible for us to conceive of the one as existing without the other. Each principle has its rights; to make either one the explanatory ground of the other would be to do injustice to this other. Hence the unitary principle to which consciousness gives us the clue must not be identified exclusively with either one of the two aspects, but rather with both of them. In consciousness, however, the two aspects are always in opposition to each other; subject and object are always found together, but they are found opposed. The one principle, then, which is to explain both and to do justice to both, must be that

[1] *S. W.*, i., 438. The real justification of idealism, however, as Fichte tells us a little later, can consist in nothing else than the successful accomplishment of its task; by means of the principle which it postulates, it must harmonise all the facts of experience (*op. cit.*, 445 f).

unity of subject and object which is never explicit in consciousness, but is always implied in it.[1]

Or, to put the matter in a somewhat different way, although consciousness itself is dualistic, yet the goal toward which it is striving is a unity. Thought is nothing else than the effort to unite these opposed terms; and the development of thought is simply the progressive realisation of that unity of subject and object which is its ideal. Thus, when we say

[1] No one can hope to solve "the problem of all philosophy . . . who does not find a point in which the objective and the subjective are not separated at all, but are entirely one". The *Wissenschaftslehre* "finds such a point and starts from it. Egohood, intelligence, reason . . . is this point.

"This absolute identity of subject and object in the Ego can only be inferred; we can never put our finger upon it as a fact of actual consciousness. Whenever actual consciousness arises, even if it be only the consciousness of self, the separation ensues. I am conscious of myself only in so far as I distinguish myself, the conscious subject, from myself as the object of this consciousness. *The whole mechanism of consciousness is based upon the various aspects of this separation of subjective and objective and of their subsequent union*" (*S. W.*, iv., 1).

"Knowing and being are separated, not outside consciousness and independently of it, but only in consciousness; their separation is the condition of the possibility of all consciousness. . . . The One which is thus separated is the ground of all consciousness" (*op. cit.*, 5; *cf.*, 42).

These passages are taken from the *Sittenlehre* of 1798; but in the *Grundlage* also, though the statements are not quite so explicit, we find the same doctrine. The infinite activity limits itself in order that it may become an Ego. But it can limit itself only by setting an object over against itself and thus determining itself as subject in opposition to this object. "In so far as the Ego posits itself as limited, its activity is directed, not immediately upon itself, but upon a Non-Ego, which it opposes to itself" (*S. W.*, i., 256). "The determination of the Ego consists in its *determinability by means of subject and object*" (*op. cit.*, 201). Thus, through the self-limitation of the infinite activity finite Ego and Non-Ego—*i.e.*, consciousness with its opposition of subject and object—come into being.

The fact that in the *Grundlage* Fichte uses the term 'Ego' both for his ultimate principle and for the subject of consciousness—the finite Ego to which an object or Non-Ego is opposed—has perhaps somewhat obscured his meaning. For this, taken with the statement that there are not two Egos, but only one (*S. W.*, i., 255), may suggest that the subject is more intimately related to the supreme principle than the object is. The difficulty really arises, however, from the fact that Fichte uses the term 'object' or 'Non-Ego' in two different senses. Sometimes the phrase signifies simply the objective principle in consciousness; and in this case the object is thought of as standing on the same plane with the subject. But when Fichte has in mind the prevailing notion of the thing as existing without relation to thought, then he is concerned to prove that the concept has no validity. The object, conceived of apart from consciousness, *is* mere *Schein*, a creature of the imagination, an *Unding;* consciousness and not the thing-in itself gives us our clue to the nature of the ultimate principle.

that our own consciousness gives us the key to the nature of the ultimate principle we mean that this principle is identical, not with consciousness as it really is, but with the ideal toward which it is working.

This conception of the supreme principle as the ideal of thought is prominent in the first period of Fichte's philosophy. The universe is interpreted in terms of the final cause; it exists in order that the Idea may be realised. The ultimate principle is not *Sein*, but *Sollen*. That highest unity for which Spinoza sought "we shall find again in the *Wissenschaftslehre*—not, however, as something that *is*, but as something that *is to be* through our agency, and yet *cannot* be".[1] God is not substance. "He is the living and working moral order," which "is built up by right-doing".[2]

In this conception, the relation between human thought and its supreme principle is a close one. Consciousness is a necessary stage in the realisation of the ideal, is in fact a partial realisation. And the complete manifestation of the Idea would be the perfected consciousness, in which the opposition of subject and object is at last overcome.[3] Thus the principle which we invoke in order to explain the nature of consciousness is not transcendent, but immanent. The ultimate ground of thought is not something outside thought, it is present implicitly in every stage of consciousness.

It must be remembered, however, that according to Fichte's view, the Idea can never be fully realised; the opposition of subject and object can never be wholly overcome. The world of consciousness is the progressive realisation of the ideal; but the progress is infinite. "The goal of the rational being is, of necessity, infinitely distant; it is a goal which cannot be attained, but to which we . . . may constantly approximate."[4]

Such is the conception of the ultimate principle which appears in Fichte's earlier works; and at first thought it seems very different from that which is found in the later writings. The change in Fichte's point of view is well brought out in the *Darstellung der Wissenschaftslehre* of 1801. In this book the term 'Ego,' which appears so constantly in the *Grundlage*, is usually replaced by the word 'knowing'.

[1] *S. W.*, i., 101. [2] *Ibid.*, v., 185 f.

[3] "The goal of this striving (the Idea of God) is an Ego, which, in its self-determination, determines at the same time all the Non-Ego" (*S. W.*, i., 23). Fichte himself would probably hesitate to give the name 'consciousness' to this ultimate unity, since consciousness in his definition of it involves the opposition of subject and object.

[4] *S. W.*, iv., 149; *cf.* i., 416 note.

The relation between absolute and particular knowing seems to be the same as that which we found in the earlier works, between the individual consciousness and its ultimate principle. Particular knowing is the realisation of absolute knowing. Knowing as absolute is never actual; it has actuality only in so far as it is a "knowing of something," *i.e.*, in so far as it draws a distinction between subject and object. "All our actual and possible knowing is never an absolute, but only a relative, knowing, which is determined and limited in one way or another."[1] Thus consciousness is an inadequate realisation of that perfect unity of subject and object—or, to use the terminology of the *Darstellung*, of freedom and being—which is never completely actual.

The relation between particular and absolute knowing is thus very close; and if absolute knowing were identified with the ultimate principle, as the Ego of the *Grundlage* seems to be, we should have no ground for thinking that there has been any change in Fichte's doctrine. But apparently absolute knowing is not the ultimate principle. "It is involved in the mere concept of absolute knowing that it is not the Absolute. Every additional word which is joined to the expression, 'the Absolute,' destroys the absoluteness. . . . The Absolute is neither knowing nor being, nor is it either identity or difference of these two; it is simply the Absolute."[2]

Many passages of similar purport are found in the various works of the second period:—

"The *Wissenschaftslehre* has been interpreted as a purely idealistic system, which takes the absolute Ego for the Absolute and tries to deduce everything from it. . . . No one, friend or foe, has risen to a higher conception of the system."[3]

The origin of absolute knowing is to be sought in "something which is not knowing at all," and which "we may perhaps call 'being'".[4]

"Nothing exists outside God . . . except knowing; and this knowing is the divine existence itself. . . . God not only is (*ist*), inwardly and concealed within himself; but he also exists (*ist da*) and expresses himself."[5]

These passages and many others which might have been quoted from the works of the second period seem to indicate

[1] *S. W.*, ii., 13. [2] *Ibid.*, ii., 12f.
[3] *Die Wissenschaftslehre* (1804), *N. W.*, ii., 193.
[4] *Ibid.* (1813), *N. W.*, ii., 3.
[5] *Die Anweisung zum seligen Leben*, *S. W.*, v., 448f. *Cf. S. W.*, ii., 686, 696; iv., 431; *N. W.*, iii., 3f.

a decided change in Fichte's position. There is little ground, however, for saying, as some do,[1] that Fichte has ceased to regard his ultimate principle as activity and thinks of it rather as mere lifeless being. Loewe, it seems to me, has proved the incorrectness of this interpretation.[2] He maintains that the term 'being,' as used in the *Wissenschaftslehre*, has two meanings. When Fichte tells us in the earlier works that mere being can never serve as an ultimate principle, he has in mind being as opposed to activity—mere lifeless being, the thing-in-itself. But in the later works, where he often applies the term 'being' to his ultimate principle, he takes pains to tell us that this being is at the same time life and activity.[3]

We cannot say then that the ultimate principle of the later works is being as opposed to activity. But on the other hand, as we have already seen, Fichte does seem to think of it as a higher principle on which knowing depends. Thus our explanatory ground is regarded as transcendent; we now try to explain consciousness, not by a unity implicit within it, but by a foreign principle.

That the change in Fichte's position, however, is not so great as it appears, becomes evident when we are able to trace the line of argument by which he passes from his earlier to his later conception. In the writings of the first period, as we have seen, stress is laid upon the statement that the Ego is not and never can be fully realised; it is simply the goal of an infinite progress. Now if we say that only the world of consciousness is real, that the Idea exists simply in and through consciousness—if we say this *and nothing more*, we seem in a sense to be exalting the world of consciousness above that Idea which we have styled its supreme principle. It is hard to see how an ideal which can never be attained and *which has no truth apart from its being attained* can fulfil our conception of the ultimate principle. If the Idea of the Ego can never be completely manifested and if it is nevertheless the supreme principle, there must be a sense in which it can be said to have validity in itself, apart from its manifestation.

Something of this kind must have been the thought in

[1] *E.g.*, Windelband, *Geschichte der neueren Philosophie*, ii., 226.

[2] *Die Philosophie Fichte's nach dem Gesammtergebnisse ihrer Entwickelung*, chap. iii.

[3] In a letter to Schelling, written in 1801, Fichte says: "If we wish to give the name of 'being' to that which even our present insight cannot penetrate . . . then God is pure being. But this being, in itself, is not compression; it is, throughout, agility, transparency, light. . . . It is being, only for the finite reason, but not in itself" (*J. G. Fichte's Leben und litterarischer Briefwechsel*, second edition, ii., 345).

Fichte's mind which led to his adopting the new form of exposition that we find in the later works.[1] At any rate this argument seems to be implied in an interesting passage in the *Thatsachen des Bewusstseins* of 1810. In this work Fichte starts with the lowest stage of consciousness and gradually develops from it the doctrine of the Idea as the ground of the world's existence. "Life exists," he tells us, "not for its own sake nor *through* itself; the ground of its existence is . . . in the final purpose." Then he goes on as follows: we cannot say that the Idea "*is* as a fact (*factisch ist*) in the sphere of phenomena," but only that it "*shall* be and become in this sphere through life itself".[2] In the world of phenomena the Idea *is* not, but simply *becomes*. In itself, however, in abstraction from this world, "it does not *become*, but *is*".[3] This must be the case if the final purpose is to be our ultimate principle. We cannot think an absolute becoming in which there is no element of fixity; such mere becoming would vanish into nothingness.[4] The eternal Idea, then, is the firm basis of all becoming.

But now can we be sure that this final purpose is absolute? "The being of life, which must be presupposed as the ground of life, becomes final purpose merely in the synthesis with becoming, which is the form of life. Outside this synthesis, beyond this form, we may not speak of a final purpose, but only of being, pure and simple. The final purpose is thus the expression of being in becoming in order that being may be made visible." This being, which appears in the form of life as final purpose, is God.[5]

It seems then that Fichte's position is this. The supreme principle may be termed 'Idea' when we think of it in its relation to the world-process, *i.e.*, to its realisation. But if we think of it in itself, apart from its realisation, we should no longer speak of it as 'Idea'. In the first case we are looking at the ultimate principle in its temporal aspect;

[1] I do not mean to deny that the charges of solipsism and atheism which were brought against Fichte by his contemporaries may have had much to do with his change of terminology. The substitution of the word 'knowing' for the 'Ego' was probably due in large measure to a desire to escape the first charge. Perhaps, too, the distinction between knowing (as God's *Dasein*) and his pure *Sein* was adopted partly for the sake of stilling the cry of 'atheist'. But in so far as the change is more than one of terminology, its ground, I think, is to be found in the train of reasoning which I have suggested. Fichte was not the man to be greatly influenced by the clamour of his opponents. Besides, as we shall see shortly, traces of the later doctrine are to be found even in the works of the first period.

[2] *S. W.*, ii., 658.

[3] *Op. cit.*, 659.

[4] *Ibid.*, 681 f.

[5] *Ibid.*, 683 f.

hence we think of it as life, activity, development. In the second case we look at it in its timeless aspect; it is that which abides throughout the ceaseless flux of the world-process.

But there is no need of regarding these two conceptions as utterly antagonistic. The temporal and the timeless view of the world are not so essentially opposed as we usually think. They are rather correlative aspects of reality; each is needed to complete the other. Hence the difference between Fichte's two periods is chiefly one of emphasis. In the one case we are concerned with the temporal aspect of the supreme principle; we think of the world-ground as the ideal which finds its truth in its realisation. In the other case we emphasise the timeless aspect; we insist that this world-ground has truth in itself whether it be realised or not. In the first case we have naturally a very close relation between consciousness and the supreme principle; in the second case the relation seems less intimate.

And a further consideration which goes to show that the difference between the two periods is not so great as it seems, is this: in each period we find unmistakable traces of the characteristic doctrine of the other period. Our discussion of this point must be brief; but it will be sufficient, I think, to establish the contention.

If we look carefully at the earlier writings we find in them suggestions of that tendency of thought which is so manifest in the later works. In the following passage from the *Grundlage*, for example, we have an anticipation of the statements which we quoted from the *Thatsachen des Bewusstseins;* for the words certainly suggest that the Idea, conceived apart from its realisation, is most adequately described as 'being'. Fichte is pointing out the difference between the *Wissenschaftslehre* and Stoicism. "In consistent Stoicism," he says, "the infinite Idea of the Ego is taken for the actual Ego; absolute being (*Sein*) and actual existence (*Dasein*) are not distinguished. . . . To the Stoic sage are attributed all the predicates that belong to the pure Ego or to God. According to the Stoic ethics we are not to become like God but we ourselves are God. The *Wissenschaftslehre* carefully distinguishes absolute being and actual existence and takes the former simply as ground in order to be able to explain the latter."[1]

This is the most striking instance that I have found in the earlier works of a disposition to think of the ultimate principle apart from its realisation; but there are several

[1] *S. W.*, i., 278 note.

passages in which we see a tendency to distinguish sharply between the principle and human consciousness. The goal of the infinite process is usually conceived, not as blank identity, the mere infinite, but as identity maintaining itself through difference, the infinite which includes the finite. Sometimes, however, Fichte speaks as if the goal of the progress were the utter annihilation of the finite.[1] And the tendency to conceive the goal thus, since it implies a sharp distinction between consciousness and its ground, reminds us of the efforts of the later period to free our conception of the Absolute from all limitations.

And on the other hand in the works of the second period, though the general tendency is to insist upon the distinction between absolute knowing and the Absolute, we find many evidences of a disposition to conceive the ultimate principle less abstractly. Although Fichte is careful to distinguish between God's *Sein* and his *Dasein*, between the outer life, of which the *Wissenschaftslehre* professes to give an exposition, and the hidden inner life, which it can indicate to us but cannot describe, yet he often insists upon the unity of these two aspects of the one essence. *E.g.*, in the *Anweisung zum seligen Leben*, he says, "God himself—*i.e.*, the inner essence of the Absolute, *which is distinguished from its external existence only for our finitude*[2]—cannot destroy this absolute fusion of the essence with the form; for even his existence . . . is not accidental, but . . . *must follow necessarily from the inner essence*".[3] And in the *Darstellung* of 1801 we find these words: "Absolute knowing produces itself from its pure possibility, as that which alone is prior to it,[4] and it is just this pure possibility which is the pure being".[5]

[1] "In so far as the Ego is limited by the Non-Ego it is finite; but in itself . . . it is infinite. These two aspects, its infinity and its finitude, are to be united. But such a union is in itself impossible. For a long time the strife is smoothed over by mediation; the infinite sets bounds to the finite. But at length, since the utter impossibility of the desired union is manifest, the finitude must be altogether destroyed: all limitations must disappear; the infinite Ego must remain alone, as one and as all" (*S. W.*, i., 144).

"The utter annihilation of the individual and its absorption into the absolutely pure reason-form or God is certainly the ultimate goal of the finite reason; only it is not possible in any time" (*S. W.*, iv., 151; *cf.*, 147).

[2] The italics are mine.

[3] *S. W.*, v., 510.

[4] A slight emendation of the text seems to be required. The original has, "Dies [*sc.* das absolute Wissen] erschafft sich eben selbst aus seiner reinen Ulögiichkeit, als das einzig ihr vorausgegebene". For the last phrase it seems necessary to substitute "als dem einzig ihm vorausgegebenen".

[5] *S. W.*, ii., 63.

Even more conclusive than these passages is a discussion in the *Wissenschaftslehre* of 1804. In the greater part of this work Fichte has been insisting upon the impossibility of our knowing anything about the inner life of the Absolute. The only insight into its nature that we can get is attained by the "self-negation of the concept".[1] This inner life is "that into which we cannot look, which remains after the most complete and penetrating insight".[2] But after dwelling for some time upon this aspect of the question Fichte finally makes the conclusion—by a long and complicated argument,[3] which we cannot stop to consider—that this negative conception of the Absolute is not the true one. For if our Absolute is the negation of knowing, it can no longer be called absolute. That which "is determined by the negation of an opposite" is a "member of a relation" and hence is no true *Ansich*.[4] In conceiving the Absolute in this way we make it into an object, which we set over against ourselves. But in order to think of it rightly we must remove from our concept all such negative determination, such relativity. And we do this only when we cease to objectify the Absolute and instead identify ourselves with it, when we think of it, not as being, set over against knowing, but as "the living *Wir in sich*,"[5] a principle which lives in us and manifests itself through us.

In the conclusion which Fichte reaches here, he seems to have overcome more fully than elsewhere the difficulties in his later conception of the ultimate principle. The relation between this principle and human consciousness is here represented as very close. It must be remembered, however, that there are many passages in the later works in which Fichte takes the more abstract view of his ultimate principle, in which he insists that its *Ansich* is higher and truer than its *Fürsich*. It is because of the numerous statements of this sort that we cannot agree with those who declare that there is no real difference between the two periods; there is an important difference of emphasis. On the other hand, however, we have seen that the later works do not represent an abandonment of the doctrines of the earlier; for in the first place the teachings of the two periods are not necessarily antagonistic, and in the second place we find in each period traces of the prevailing doctrine of the other.

[1] *Cf.* the *Darstellung* of 1801: "Knowing . . . cannot contemplate its absolute origin without contemplating its boundary, its not-being" (*S. W.*, ii., 63).

[2] *N. W.*, ii., 150.

[3] *Op. cit.*, 170-202.

[4] *Ibid.*, 202 f.

[5] *Ibid.*, 206.

IV.—SOME NEW OBSERVATIONS IN SUPPORT OF THOMAS YOUNG'S THEORY OF LIGHT- AND COLOUR-VISION (III. Conclusion).

By W. McDougall.

Section VI.—Contrast, Induction and After-images of Coloured Light.

I turn now to the consideration of the phenomena of simultaneous contrast and induction and of after-images of coloured lights.

Helmholtz, in attempting to explain these phenomena, relies to a great extent upon the principle of psychological contrast, and attributes a very important part to the so-called 'Eigenlicht' of the retina. As regards the former the unprejudiced reader must admit that Helmholtz's reasonings do but establish the fact that psychological contrast sometimes plays some part and that Hering's observations and reasonings have proved that it plays at most but a minor part, and in some cases of contrast plays no part at all.[1] As to the important *rôle* attributed by Helmholtz to the 'Eigenlicht,' it has now been pretty conclusively shown that the 'Eigenlicht' is chiefly, if not wholly, of cerebral origin (see Müller, *op. cit.*, § 33). Further, the most casual observation will suffice to convince any one, whose 'Eigenlicht' has not a much greater brilliancy than mine, that it is utterly incompetent to produce the effects ascribed to it by Helmholtz. When, for example, on fixating a S disc on a bright W ground, the S becomes gradually almost as bright as the W ground and leaves, as in observation i., a brilliant W after-image, and when two such after-images inhibit one another alternately (observation xiii.) it would be manifestly absurd to attribute these after-images to the 'Eigenlicht' of the retina exalted by psychological contrast. Helmholtz, however, has been the chief modern exponent of Young's theory and his system

[1] See especially *Pflüger's Archiven*, Bd. 40. 41, 43.

of forced and unreal explanations of this large group of phenomena has come to be accepted by many, half unconsciously no doubt, as an essential part of the theory, and to this compound the name 'Young-Helmholtz theory' is commonly applied. The strength of this association is, I think, the principal cause of the want of popularity of Young's theory at the present time. For Hering having shown very convincingly the inadequacy of Helmholtz's system of explanations, many readers, in rejecting this part of the compound, have been led to reject the whole, and it is, I think, no exaggeration to say that the weakness of Helmholtz's explanations of these phenomena has been and is the main strength of Hering's theory. It is for this reason that it seems undesirable to associate Helmholtz's name with Young's in speaking of the theory proposed by the latter.

Simultaneous Colour-contrast.

The broad facts of simultaneous colour-contrast are that when part of the visual field is of one colour and the rest of the field is a grey, the grey tends to appear tinged more or less strongly with the colour complementary to that of the coloured area; this contrast-colour tends to be most strongly developed in the immediate neighbourhood of the coloured area; and a grey of about the same brightness as that area is most favourable to the appearance of the contrast-colour, while on a S ground, such as the opening of the dark-box, it is not perceptible; if the ground on which the coloured patch lies be also coloured in some other tone, this tone tends to be inclined towards the true complementary to the coloured area.

By the observations recorded in sections i., ii. and iii. I have endeavoured to show that the darkening contrast-effect exerted by a W area on adjoining grey areas is due to the inhibitory effect of the more vigorous cortical processes, excited by the W area, on the feebler cortical processes excited by the grey areas; and I have now to extend the same principle to the explanation of simultaneous colour-contrast. If the explanation is the true one in the case of the contrast effects of W, then it must also hold for colour-contrast, if Young's theory be true. For W being the resultant of simultaneous activity of the R, G and B colour-systems, inhibition of W by W must be expected to involve inhibition of R by R, G by G, and B by B. This is, I believe, the principle underlying the phenomena of colour-contrast.

In the cortical level of each colour-system the activity of any one part tends to inhibit the activity of all other parts, and when any one part is more intensely excited than the rest its activity does partially or completely inhibit that of all other parts of the cortical area of the same colour-system. (This relation between the parts of the cortical area of each colour-system is indicated in the diagram, figure 15, by the radiating arrows.) Suppose then that all parts of all three colour-systems are equally excited to a moderate degree, except that one small part of one system, say the R system, is more highly excited; this is the condition obtaining during fixation of a grey surface with a patch of R upon it. Then the activity of this more highly excited part of the R cortical area depresses that of the rest of the R cortical area, more especially that of the immediately surrounding parts, with the result that in the parts of the field surrounding the R patch the activity of the B and G systems predominates over that of the R, and the grey ground appears B – G. When the balance of the activities of the three cortical levels has once been turned in this way in favour of the B and G systems, the predominance of the B and G systems must be still further increased by that antagonism between the corresponding parts of the cortical areas of the three colour-systems which was demonstrated in the preceding section, *i.e.*, the activity of the R cortical area must be still further depressed or inhibited by that of the B and G areas.

I must diverge here to draw attention to the fact that the theory of contrast outlined above is not a new one. Since the first part of this paper was printed I have come upon three papers by Prof. Rollet,[1] in which, after criticising Helmholtz's and Hering's theories of contrast, he proposes one essentially similar to that suggested above. His words are "Das was bei allen Contrast-versuchen gleichmässig in Betracht kommt, ist also dass ein bestimmter Reiz der den Netzhautort *a* trifft und einen auf diesen Netzhautort bezogenen Eindruck von bestimmter Qualität zur bewussten Wahrnehmung bringt auch die Wirkung hat dass in einem gleichzeitigen Eindruck, welcher auf einen zweiten von einem anderen Reiz getroffenen Netzhautort *b* bezogen wird, ein aliquoter Theil der dem ersteren Eindrucke gleichnamige Componente entfällt, während derselbe vorhanden gewesen wäre, wenn auf den Ort *β* derselbe Reiz für sich allein bei übrigens ganz unerregter Netzhaut gewirkt hätte". Rollet claims the phenomenon of simultaneous induction of same-

[1] *Wien. Berichte.*, Bd. lv., 1867.

coloured light as a support to his theory, for he considers that the compound light of the grey ground is broken up by the contrast effect into two parts which make themselves felt alternately. In this last suggestion I cannot follow him, but it will be seen that in the paragraph quoted he formulates the theory of contrast sketched above, and that his presentation of it differs from mine only in that the processes concerned are conceived less definitely and in less detail.

Rollet's theory of contrast does not seem to have been favourably received, but it may be hoped that the new facts and points of view put forward in the foregoing sections have now prepared the way for its acceptance. I have also to record further observations directly supporting the theory. In observation x. I described how a patch of bright W light totally inhibits the consciousness of a duller patch of W light thrown upon the retina at some distance from the former. If this theory of contrast be the true one, it must

FIG. 21.

be possible to effect two variations of this experiment, it must be possible to observe under similar conditions the total inhibition of coloured light by W light and the total inhibition of one of the constituents of the sensation of W light by a patch of bright coloured light. I therefore made the following observations.

Observation XXXVIII.—Sunlight was reflected upon a plate of milk-glass fixed, as in the case of observation x., behind the photographic shutter and covered with S paper save for a circle 5 cm. in diameter. Outside the shutter two sheets of R gelatine were pinned over the aperture. At a distance of 30 cm. from the circle a sheet of W paper was pinned against the dark window-shutter (W in figure 21) and illuminated by dull diffused daylight. From a distance of 70 cm. I fixated a point × midway between the W paper and the circle. On opening the photographic shutter the circle, hitherto a dull W, becomes a bright R. If the shutter be opened in the first few seconds no marked change of

colour of W is perceptible, generally only a slight reddening of it through irradiation and reflexion of R light from my face. But if fixation be continued for fifteen seconds or more and the shutter then opened the W square becomes at once B-G of good saturation and slightly varying tone, the B and G seeming to struggle together slightly. The square remains B-G so long as the circle remains bright R and when the shutter is closed it brightens somewhat, loses its B-G colour and becomes faintly tinged with R. This I have repeated with the W square and the R circle at various angles apart, and it was then obvious that the contrast effect was greater the smaller the angle between them.

Here then we see inhibition of the R element of the W sensation (excited by the square) by the more intense R of the circle. But, under the conditions of the observation, the inhibitory effect is not strong enough to make itself felt unless the area of the R cortex corresponding to the W square be first fatigued by a fixation of fifteen seconds or more, just as was the case in observation x.

Observation XXXIX.—The W square of the preceding observation was replaced by a smaller square of W paper and on this was placed a still smaller square of R paper about 3 cm. in width, and the R gelatine was removed from the path of the sunlight, so that opening the shutter then gave a bright W circle. Using an artificial pupil, I fixated the point × as before for fifteen seconds and then opened the shutter. The R square and the dull W ground on which it lies both fade completely if the W light of the circle be bright enough, and return dimly on continued fixation. If the W light of the circle be made rather less bright, then on opening the shutter the colour of the R square disappears and the R and W paper become indistinguishable and appear as one dull grey square. If, on the other hand, the illumination of the R square is increased, then it does not disappear or become grey on opening the shutter, but its colour changes suddenly to pure G.

This last phenomenon is another case of the reversal of colour during prolonged fixation and its full explanation must be postponed. It is however clear that the main factors are as follows: During the preliminary fixation the area of the R cortex excited by the R square becomes fatigued while the corresponding area of the G cortex is hardly at all fatigued, for the G system is more feebly excited in the retina and its cortical processes are partially or wholly inhibited by the dominant activity of the R cortex. When then the activity of this fatigued area of the R cortex is

inhibited by that of the area excited by the bright W light, the corresponding area of the G cortex springs into activity. That the G alone makes itself felt without the B is probably due to the relatively greater vigour of the G systems of my eyes.

When the image of the R square fades completely on exposing the bright W light, this can only be because the excitement of one part of the R cortex by the bright W light is more intense than that produced in the other area of it by the dull R light, and therefore predominates over and inhibits it.

We are now in a position to understand more fully observation xxiv. In that case we saw that a colour of low saturation on a grey ground becomes less perceptible and may become invisible when the grey ground is replaced by a W one. Now it is obvious that if the W sensation be determined by an altogether separate and independent process as Hering claims, then it should exert upon a neighbouring coloured area no other contrast-effect than a mere darkening of it, except that in the case of a colour of low saturation (in Hering's phraseology—a colour mixed with much light grey), such as was used in observation xxiv., the W ground should, by diminishing the proportion of W mixed with the colour, render the colour more saturated and more easily perceptible than when it is upon a grey ground—the reverse of the effect actually produced.

There is another feature of observation xxxviii. that is quite inexplicable by Hering's theory of contrast. When the bright R light is exposed the B-G colour appears upon the dull W patch only and not at all over the rest of the field. Now the rest of the field is a very dark grey, and if the R light really produces its contrast effect by inducing increased assimilation of a R-G substance in the surrounding areas the complementary contrast-colour should appear at least equally, if not more, vividly over all that part of the ground that lies at a less distance from the R circle than the W square does.

Rollet's theory of contrast, on the other hand, does not expect any such appearance of B-G on the dark ground, for where there is no appreciable activity of all three colour-systems an inhibitory effect exerted upon one of them cannot cause the other two to affect consciousness. Rollet's theory then explains admirably why it is that the grey, upon which simultaneous contrast-colour most readily and markedly appears, is one of about the same brightness as the contrast inducing area.

Prof. Ebbinghaus[1] offers the following explanation of the absence of contrast-colour on a dark ground :—every patch of coloured light tends to be surrounded by a same-coloured halo due to diffusion of the coloured light in the media of the eye. This colour, due to diffusion, asserts itself, he says, relatively more when no objective light comes from the ground surrounding the coloured patch than when that ground is a grey, therefore when the ground is dark the contrast-colour may be neutralised or even reversed by the effects of this diffused light. But to try to help Hering's theory out of its difficulty by this argument involves a logical error, a begging of the question in dispute, for if the colour due to diffusion of light shows up best on dark ground why should not also the colour due to contrast show up best on the same dark ground? Ebbinghaus assumes for his explanation that the colour due to contrast and that due to diffused light are differently affected by mixture with the light from a grey ground, but this is just the point that has to be explained.

The observations recorded above are then quite incompatible with Hering's theory or other form of the 'Gegenfarben' theory, while they are just such as are demanded by Young's theory of light- and colour-vision and by Rollet's theory of contrast.

Simultaneous Induction.

The phenomenon of the simultaneous induction of coloured light resembles closely that of W light. It consists in the appearance of the same colour around a patch of any colour when it has been steadily fixated for some little time, generally ten seconds or more. It may appear on a surrounding grey ground on which the contrast-colour has not been perceptible or it may appear as a sudden reversal of the contrast-colour. The longer fixation is continued the brighter the induced light becomes and the further it spreads away from the inducing patch of light over the ground. The principal argument that I directed against Hering's theory of the causation of the simultaneous induction of W light (section iii.) applies even more strongly in the case of coloured light. For the same colour is induced most readily on a ground of S velvet or on the intense S of the dark box, and least readily or not at all on a ground which shows a well-marked contrast-colour.

[1] *Grundzüge d. Psych.*, p. 223.

The following observation brings out the contest of two factors of different nature and independent of one another, the contrast effect and the induction of same-coloured light.

Observation XL.—I laid a sheet of R paper, with a hole 3 cm. square at its centre, on a smooth grey surface of about the same brightness. On fixation of a point at the centre of the grey square with one eye only and relaxed accommodation, the square appears a fairly bright G of low saturation. After twenty seconds' fixation there becomes perceptible on the square a vague struggle of R and G in tiny points, G predominating for the most part. This appearance seems to persist as long as fixation is continued under the same conditions, but if at any moment I increase my accommodation (which of course involves a narrowing of the pupil) the R ground becomes either G or a neutral tone, according to the degree of accommodation and narrowing of the pupil, and in either case the square becomes at the same moment a bright R of fair saturation.

In section iii. I have argued that the appearance of simultaneously induced light is due to the diffusion, out of the retinal area affected by the light-rays into the surrounding parts of the retina, of the X-substances set free by the light-rays. In the case of coloured light we have to assume that light of any particular colour, say R light, sets free more of the R X-substance than of the B and G X-substances. The R X-substance, therefore, diffuses into the adjoining area in larger quantities than the G and B X-substances, and spontaneously exciting the nerve-endings of the R-system in these parts of the retina tends to give rise to a sensation of R surrounding the fixated patch of R.

In the above case (observation xl.), then, so long as the R ground is seen as R, it inhibits the activity of the R-system in the area of the grey square, and so prevents the appearance of the simultaneously induced R, and the diffused R X-substance makes itself felt only by neutralising more or less the contrast-colour; but when, owing to the narrowing of the pupil, the colour of the R ground is reversed, or even only the predominance of the R abolished so that the ground becomes neutral, the diffused R X-substance is able to produce its full effect on the cortex, and the induced R appears pure and unmixed with the contrast-effect.

A similar effect may be observed if, after fixating the centre of a patch of grey on a R ground for thirty seconds or more, the eye be brought nearer to the point fixated. There appears at once a zone of G forming the border of the square, and the remainder of it stands out as a R patch. In this

case, when the eye is brought nearer, the R of the ground no longer immediately adjoins the retinal area into which the R X-substance has diffused itself, its inhibitory influence on the R cortex of this area is therefore weakened and the excitement of the R system (by the diffused R X-substance) is then able to spread through the cortex and affect consciousness.

The After-Images of Coloured Lights.

I have made many series of observations of the after-images of coloured lights. Some of these I have already described summarily in section iii., but, before discussing the causes of these after-images, it is necessary to describe in some detail a complete series of observations, in order to show clearly the inadequacy of the explanations offered by Hering and by Helmholtz and to give a sufficient basis of facts for the discussion.

In attempting to arrive at an understanding of the factors concerned in the production of these so various and perplexing appearances, it seems desirable to study them under the simplest possible conditions. By using as the source of light a shaded disc, such as is described in section iii., and by observing the after-image following fixation of it in complete darkness, two obvious sources of complication and confusion may be avoided. When a sharply bounded patch of light is fixated the after-image of it is complicated by the presence of some halo. The halo not only affects and so complicates the pure after-image effect, but has led to the confusion in description of after-images as positive and negative according as they are brighter or darker than the surrounding ground. The projection of an after-image on to a grey surface complicates the effects in two ways; firstly, the rays from the ground modify the action in the retina of the X-substances remaining there and set free more X-substances, secondly, the activity of the ocular muscles during projection is unfavourable to the free play of rivalry among the colour-systems, inasmuch as it tends to prevent 'complete fading'.

Both these complicating influences favour, for reasons that I shall explain below, the appearance of a complementary coloured after-image.

The after-images described below were therefore observed under these simplified conditions.[1]

[1] A piece of apparatus, which may be called a portable dark chamber, is very useful in the study of after-images. It consists of the following parts: a piece of 1 inch plank, 18 inches in width, and 2 feet 6 inches in

Observation XLI.—I observed the after-images given by R, Y, G, G-B, B and P lights, at three different intensities for each colour. In each case the after-image followed the fixation for sixty seconds of a point at the centre of the shaded disc.[1] The disc transmitted light from the sky or sun, the light being coloured by passing through one or more layers of coloured gelatine pinned over the aperture in the window-shutter, behind which the photographic shutter and glass-plates were set up. At each of the three intensities I attempted to make the different colours of about equal brightness and saturation. The colours of the lowest degree of brightness were given by the light from a grey sky falling through one or two sheets of gelatine and the plate of milk-glass. They were of about the lowest degree of brightness that will give a coloured after-image in the dark, and after fixation lasting less than fifteen seconds they give grey after-images only. The colours of the second degree of brightness were given by sunlight falling through five to eight sheets of gelatine and the plate of milk-glass. These were bright colours of good saturation. The colours of the third degree of brightness were given by sunlight falling through a shaded disc of ground-glass covered by only two or three sheets of

length; a square board of well-seasoned timber, 2 feet 6 inches in width, stands vertically upon this plank, its lower edge is let into a slot running along the middle of it, and it is held firmly in position by angle-pieces. A little above its centre, the square board has a circular hole, 3½ inches in diameter. At the top corners of the board a pair of light wooden rods are attached by hinges and can be fixed so as to project horizontally from it, parallel to one another, and at right angles to the plane of the board. Two pieces of black cloth, the inner one of black velvet, the outer of black linen, each about 3½ yards in length, are tacked by one edge to the top and sides of the square board and spread over the horizontal rods. A strip of cloth about 1 yard wide tacked by one edge to the base-board and a back-flap of black velvet complete the walls of the chamber. The base-board being placed upon a table at one edge the observer sits within the curtains with his eyes at the level of the hole in the vertical board, and by sitting upon the free ends of the curtains can completely exclude all light. On the inner surface of the vertical board, above and below the circular hole, are two pairs of projecting ledges to hold the photographic shutter and the glass plates. Where no dark room is available this simple piece of apparatus can be made to serve many of the purposes of one. It can also be used as a 'Dunkel-Tonne,' and even where a dark room is available this dark chamber presents the advantage that it can be placed so as to receive the direct rays of the sun through the hole in the vertical board. I have made a second example with two apertures about 9 inches apart in place of the one, each being filled with shutter and glass-plates. This is in many ways a great improvement. I find the Thornton-Pickard shutter for time and instantaneous exposures well suited for use in such a chamber.

[1] This disc is described in observation xvi., section iii.

gelatine. These were so bright as to be a little trying to the eyes and were of lower saturation than those of the second degree of brightness. In the following paragraphs the colours of these three degrees of brightness are referred to as the dull, the bright and the very bright respectively.

In the after-image the part corresponding to the shaded border of the disc is for the most part coloured differently and frequently complementarily to the brighter central area, but it is in all cases so much less bright than the latter that it is incapable of affecting it appreciably. It is therefore neglected in the following descriptions of the after-images of the bright central area of the disc.

Dull R.—After-image,—G in first half-second, then R three seconds, turning rapidly to pure B on which patches of G soon appear. The patchy B and G persist sixty seconds.

Bright R.—After-image,—bright pure G two seconds, followed by B three seconds, then B and G struggle for fifteen seconds, after which a dull B-G gradually fades away in two minutes.

Very Bright R.—During fixation the R loses saturation rapidly, and towards the end specks of B and G appear upon it. After-image,—bright R seven seconds, orange R thirty seconds, orange struggles on G ground seventy seconds, pure dark G fading away in ninety seconds and showing traces of B at moments.

Dull Y.—After-image,—a reddish blur of light in first second, then pure G for four seconds, after which patches of B appear and a struggle of dull B and G persists to the end.

Bright Y.—After-image,—bright B of very low saturation two seconds—then R, which after five seconds begins to become tinged with B and passes through P and B to a patchy B-G that persists to the end.

Very Bright Y becomes during fixation a bright pure R after a few seconds. R persists only five seconds and then passes back rapidly through Y to pure bright G, which persists. After-image,—bright Y, becoming more G until after fifteen seconds it appears as G struggling upon R ground. The struggle continues sixty seconds, the G retreating towards the centre and breaking up into patches. Then pure R thirty seconds, then short period of struggle of R and B in which they alternate completely several times and B triumphs and persists forty seconds and then gives way to dark G, which slowly fades away.

Dull G.—After-image,—P disc fading gradually in eighty seconds without change of colour.

Bright G.—After-image,—bright G seven seconds, then changes to a bluish P, which becomes more B until pure B only remains and persists to the end.

Very Bright G becomes B-G towards the end of the fixation. After-image,—bright G lasting, with a few momentary appearances of R patches upon it, for 120 seconds, then G struggles in patches upon R ground for about sixty seconds, then pure R for thirty-five seconds and then dull B fading slowly away.

Dull B-G.—After-image,—B-G four seconds, then R, which passes rapidly through dull orange and Y to G and so fades slowly.

Bright B-G.—After-image,—G two seconds, R five seconds, then B fading slowly away.

Very Bright B-G.—After-image,—bright B-G ten seconds, then pure bright G, with a few momentary appearances of patches of B on it, lasts fifty seconds and then struggles upon and yields to R, which persists alone and pure thirty seconds; then R struggles on B for thirty seconds, B predominates and persists alone twenty seconds and then gives way to dull G, which fades away in about fifteen seconds.

Dull B.—After-image,—B of low saturation three seconds, then passes in ten seconds through P, R and orange to dull Y, which fades away in forty seconds.

Bright B.—After-image,—B five seconds, P five seconds, then Y-G, fading away in about seventy seconds.

Very Bright B.—After-image,—bright B of low saturation ten seconds, then B struggles upon bright G ground sixty seconds, then pure G disc with R edge. After forty seconds G gives way to the R, which persists seventy seconds and then gives way after a short struggle to B. B persists forty seconds and then gives way to patchy dark G which fades slowly away.

Dull P.—After-image,—P two seconds, then Y-G, becoming rather purer G and fading in forty seconds.

Bright P.—After-image,—bright P twelve seconds, then Y-G, rapidly becoming pure G and fading in ninety seconds.

Very Bright P.—After-image,—bright P of low saturation, rapidly resolving itself into B struggling upon a R ground. After thirty seconds B yields to R, which persists alone and pure twenty seconds and then struggles upon and yields to G, which fades slowly away.

Besides the above series I have made a great number of observations of the after-images following the fixation of lights of all colours and brightnesses for periods varying from two seconds to two minutes, and in some cases for

very much longer periods, and I have used both the shaded and half-shaded and the sharply bounded disc. For the very bright colours the half-shaded seems to give just as good results as the fully shaded disc, but for the less bright colours it is important to use a disc which has a broad and perfectly smoothly shaded border, in order to avoid complication of the after-image by halo effects.[1]

The after-images described above are typical specimens of those that follow the fixation of the shaded disc. I do not mean that the order of appearance and duration of the different phases are constant, for, in the case of after-images following the less bright colours especially, very slight changes in the conditions may alter the after-image very considerably. But certain features that are quite constant may be summed up as follows: (1) The after-images of the coloured shaded disc show in nearly every case a play or succession of colours, in which each of the three colour-systems makes itself felt in some phase. (2) The brighter the coloured light fixated, the brighter are the colours of the after-image, and the more keen is the antagonism between the different systems, so that the colours fuse less than in the after-image of duller colours; and when the colours are very bright the three simple colours, R, G and B tend to appear pure and saturated in turn in a recurring cycle, the unchanging phases of pure colour being separated by periods of struggle between the fading and the succeeding colour, just as is the case in the after-image of bright W light. (3) In the case of fixation of one of the three simple colours, R, G and B, the lower intensities are followed by after-images in which the other two colours predominate, more or less fused together, *i.e.*, the after-image is predominantly complementary coloured; while when the colour fixated is very bright the first phase of the after-image is usually same-coloured and of considerable duration. The like holds true for the compound colours but in their case the phases of the after-image tend to be rather more varied. (4) The order of occurrence and the duration of the different phases varies readily with slight variations in the conditions. The last feature is well illustrated by the following observation.

Observation XLII.—The shaded disc of milk-glass covered with two sheets of G gelatine and exposed to a bright grey sky appears as slightly yellowish G of fair saturation and brightness. Every period of fixation of this disc from ten to

[1] Such a perfectly smoothly shaded border may be best obtained by passing the light through a shaded disc of ground-glass and then through a plate of milk-glass, fixed about half a centimetre behind the ground-glass.

sixty seconds was followed immediately by pure B of fair saturation which gives way to R after from three to five seconds. I then removed one sheet of G gelatine and so caused the G disc to appear slightly brighter and slightly less saturated. Every period of fixation from ten to sixty seconds was then followed immediately by G, which after five to ten seconds gave way to R. The R persisted to the end but in the case of the longer fixations became mixed with B.

I then put over the disc a sheet of dark cardboard with a hole in it through which the bright centre only of the shaded disc was visible. Every period of fixation from ten to sixty seconds was followed immediately by R which passed slowly through P to B.

In this case then the same colour-tone, G, was followed immediately by B, G or R according to slight changes in the conditions of fixation. The observation also illustrates the fact that the presence of a sharp margin to the patch of light fixated favours the predominance in the after-image of the complementary colour.

I have stated above that projection of the after-image of coloured light on to a W or grey ground favours the predominance of the complementary colour. This fact is illustrated by the following observation.

Observation XLIII.—The very bright R shaded disc was fixated sixty seconds. The after-image in the dark was R and on projection on to a dull grey surface (a sheet of W blotting paper in dim light) it remained R, but on increasing the illumination of this surface the after-image became at once G, and on again diminishing the illumination it became R again; and this reversal of the same-coloured after-image by projection upon a W surface occurs constantly if the W surface be bright enough.

One other feature of the after-images of coloured light of medium intensity must be mentioned here. With any given light, the vividness and the duration of the after-image, observed in the dark, increase with increase of duration of fixation of the light from about ten seconds up to about ninety or one hundred seconds, but with further increase of the period of fixation the duration and vividness of the after-image not only do not further increase but diminish, so that after very prolonged fixation the after-image is either dull and of short duration or not to be seen at all.[1]

[1] Mr. G. J. Burch has observed the effects of exposure of the eye to very bright coloured lights and his observations and conclusions seem to be in harmony with my own, save that he is led to regard violet as a fourth kind of simple colour-sensation (see *Proc. Roy. Soc.*, vol lxiii.).

The Relation of the After-image to Its Halo.

If a sharply bounded patch of coloured light be fixated for more than a few seconds the after-image of it is usually surrounded by a halo. As in the case of the after-image of W light, the halo seems to be due to the persistence in the retina of the diffused X-substances to which the appearance of the simultaneously induced light is due. If the coloured light fixated is not very bright and the fixation not very prolonged the halo is of the same colour. But the longer fixation is continued the brighter and the less saturated is the colour of the halo, until after a prolonged fixation it becomes W or even tinged with the complementary colour and is so much brighter than the after-image itself as to inhibit it partially or wholly. The colours of the after-image and of its halo tend to be complementary to one another, for during the observation of an after-image in the dark the conditions are very favourable to contrast-effects,—there is unchanging or only very gradually changing retinal stimulus and there is no reinforcement of the cortical processes by activity of the ocular muscles. On projection on to a W ground the halo is reinforced more than is the after-image, so that, in the case of an after-image bright enough to inhibit its halo wholly or partially in the dark, projection on to a W ground may cause the halo to predominate over the after-image. These features of their relation are illustrated by the following observations.

Observation XLIV.—I put a plate of ground-glass behind the photographic shutter in the dark cabinet (described above, p. 355) and on the centre of the plate an opaque black ring, 1 cm. in width and having an internal diameter of 1 cm. On allowing the light of a strong lamp to pass through a sheet of R gelatine and the glass plate, there appears a broad dark ring upon the centre of a bright R ground. By this arrangement the halo-effects are produced in the area of the dark ring more vividly than on a dark ground merely surrounding a patch of coloured light. On fixation of a point at the centre of the ring, the dark ring appears slightly G in the first few seconds and then rapidly becomes R. If the after-image be observed in the dark after five or ten seconds' fixation the ring appears as a R of good saturation on a B-G ground; after twenty seconds' fixation the ring appears in the after-image a brighter and less saturated R; after forty seconds it is a very pale bright R, after sixty seconds it is W, and after ninety seconds' fixation it is a bright very pale G, *i.e.*, W tinged with G. The B-G ground

is duller in proportion to the brightness of the R and is partially inhibited by the brighter ring, for when, in the after-image following sixty or ninety seconds' fixation, the bright ring occasionally fades for a moment, the ground starts out more brightly in the same moment.

Observation XLV.—The glass plate used in the preceding observation, with the same dark ring upon it, was exposed to bright direct sunlight, without any coloured gelatine interposed. On fixating the centre of the ring the very bright W ground darkens during the first ten seconds and then begins to become B-G and after another ten seconds appears as a very saturated intense B-G. After fifteen seconds the B-G of the ground begins to struggle with R and very soon gives way to a pure R, also of good saturation. During this time the dark ring, at first showing only a faint brightness due to irradiation, becomes continuously brighter until after fifty seconds it is of about the same brightness as the ground. While the ground is B-G the ring is R of low saturation, and when the ground becomes R the ring becomes B-G of low saturation. On excluding all light after fifty seconds' fixation, the after-image is absent during the first two or three seconds, and then appears as a W ground with the dark ring upon it, and brightening rapidly and turning G. The ground remains bright G for forty seconds, and during this time the ring brightens and becomes R; then, after a short struggle, the G of the ground gives way to R, and the ring becomes G and is now about as bright as the ground. If during the earlier stage of the after-image, in which the ring appears dark on a bright G ground, it be projected on to a dull W surface, the ring becomes a bright W, while the G ground is only dimly perceptible, and throughout the course of the after-image projection of it on to a W ground has the effect of reinforcing the ring, so that it predominates over and more or less inhibits the colour of the ground.

Theory of After-images.

Any theory of after-images must account for all those features of the after-images of coloured lights enumerated on page 359, and also for those features of the halo and of its relation to the after-image described above; and it must also be brought into relation to the explanation of the phenomenon of reversal of colour of a fixated patch of coloured light on diminution of its brightness, on simple prolonged fixation and on adding W light to it; for clearly the reversal

of colour in these cases is closely related to, *i.e.*, is determined by much the same factors as determine, the appearance of the complementary coloured after-image.

Hering's theory is quite incapable of accounting for some of the most striking and fundamental of these facts. His theory demands that a coloured light be followed, if by any after-image, by one complementary in colour to the light fixated, and the more intense the colour and the longer the fixation the more vivid and persistent should the complementary colour be. For the greater the amount of dissimilation brought about by the action of the light rays the greater must be the tendency to assimilation in the period following their action, and conversely. Müller's improved form of the theory makes the same demands, for the passage quoted in section iii., page 73, applies to R and G and to Y and B as well as to W and S. But we have seen that same-coloured after-images occur, under suitable conditions, with just as great constancy as do complementary coloured under other conditions, and it is precisely when the coloured light is intense that the same-coloured after-image appears most constantly, while prolongation of the fixation of coloured light beyond a certain point not only does not increase the vividness and duration of the complementary after-image but diminishes them. Nor when the after-image is other-coloured is it constantly complementary coloured; when the coloured light is very bright the three pure colours tend to succeed one another in a recurring cycle, as in the after-image of bright W light; and when the light is not very bright and the after-image is other-coloured it is frequently far from being complementary coloured,—thus I have frequently observed a pure bright R light to be followed immediately by a pure B after-image lasting many seconds, and in such a case adding B to the R light does but increase the predominance of B in the after-image. It is perhaps hardly necessary to point out in detail how Hering's theory fails to explain many other of the features described above. The fact is that in dealing with the after-images of coloured light, just as we have seen in the case of the after-images of W light, Hering's theory appears plausible only so long as we confine our attention to the after-images given by slips of coloured paper or lights similarly restricted in range of intensity and conditions. Hering has seemed to recognise this and has entered the following protest against the use of lights of higher intensity: 'Vor der Anwendung einer irgend starken Beleuchtung muss bei diesen wie bei allen folgenden Versuchen ganz besonders gewarnt werden, weil man dadurch

nicht blos seine Augen angreift, sondern, was das eigentlich Wesentliche ist, *ganz andere und sozusagen unreine Resultate bekommt.* Wie es nicht zweckmässig wäre, die Untersuchungen über den Wärmesinn damit zu beginnen, dass man übermässige Hitze oder Kälte auf die Haut wirken lässt, so ist es auch methodisch falsch, die Netzhaut mit intensivem Lichte zu blenden, wenn man ihre sozusagen normale Thätigkeit untersuchen will.'[1] That is to say that results that do not lend themselves readily to his explanations are to be regarded as impure and negligible. Surely a somewhat dangerous principle in scientific research!

It may be retorted too that we wish now, not merely to begin the study of light- and colour-vision, but to arrive at definite views as to the physiological processes involved, and that to restrict ourselves in the course of this study to lights of so limited a range of intensity, as Hering desires us to do, would be like attempting to make a complete investigation of the temperature-sense without ever experiencing affections of that sense other than gentle warmth and coolness. Even if the observations recorded above involved the use of lights so bright that their effects must be considered more or less pathological, a true theory of vision must still be capable of accounting for them. But I do not think that the lights used can be considered to be of this nature, for, as I have mentioned above, I have experienced but very slight evil effects from their use, and these resulted rather from very prolonged fixations of lights of medium intensity than from fixation of brighter lights.

The explanations of the after-images of coloured lights suggested by Helmholtz are, if possible, even less satisfactory than those suggested by Hering. Helmholtz's explanation of same-coloured after-images consists in the simple statement that the condition of excitement persists after the light ceases to act, that 'der Reizungs-zustand noch eine Zeit lang dauert'.[2] The complementary after-images were ascribed by him to fatigue of the retina, to a diminished excitability of the retinal area affected for the kind of stimulus previously applied. This explanation has some plausibility and probably some truth in the case of after-images projected upon more or less brightly lit surfaces; but we are asked to believe that, in the case of similar after-images seen with closed and covered eyes, the colour is an expression of the fatigue of that part of the retina towards the

[1] *Zur Lehre vom Lichtsinne*, S. 4 (italics are mine).
[2] *Phy. Optik*, 2nd ed., p. 508.

inner stimulus to which the 'Eigenlicht' is due. By any one to whom, as to me, complementary coloured after-images may appear in the dark so very much more vivid than any 'Eigenlicht' this suggestion cannot be entertained for a moment. Further, it is not obvious why, according to Helmholtz, a bright colour, fixated for as long as sixty seconds, should usually be followed by an after-image that is same-coloured even when projected upon a W surface. For fatigue must be considerable in such a case, and if it be a dominant factor the after-image should be complementary coloured.

While, then, Hering's theory is incapable of accounting for positive and same-coloured after-images, Helmholtz's is equally incapable of explaining complementary coloured after-images seen in the dark, and both these theories of after-images stand condemned by the fact that their authors are driven to ignore or make little of a large number of the phenomena that any such theory must account for.

In offering the following account of the processes underlying the phenomena of after-images I do not presume to claim that it is correct in every particular, but I claim that the main outlines are correctly drawn and that the processes actually concerned are indicated, although the relative importance of the part played by each factor may be incorrectly estimated. For all the processes are incapable of being directly observed or indirectly observed singly, and their nature can only be inferred from the complex results produced in consciousness by their common action under different conditions. Although the account is complicated, I do not think that it is too complicated relatively to the facts to be explained. So complex and various a group of phenomena must depend upon complex causes.

In the case of the after-images of W light, I have already in section iii. shown reason to believe that they are due primarily to the persistence in the retina of exciting-substances, or, as I have called them, X-substances, set free in it by the action of the light-rays. I believe that the same principle underlies all after-images, *i.e., that all after-images, negative and positive, same-coloured and complementary-coloured alike, are primarily due to the persistence in the retina of X-substances set free in it by the action of the light rays on stored up mother-substances. These X-substances continue to act upon the endings of the optic nerve in the retina and thereby to be used up gradually. In the dark the relative intensity of the action of any one of the different X-substances is chiefly a function of the quantity of that substance present in unit area of the retina. The frequently occurring changes in the brightness and colour of parts of after-*

images are, with the exception of the gradual diminution of intensity due to the using up of the X-substances, all determined by changes in the cortex and not by changes in the retina.

I must recall here the account given in section iii. of the effects of the action of W light on the retina. Evidence was there brought forward to show that when W light falls upon an area of the retina it sets free in that area X-substances that are capable of exciting the nerve-endings in the absence of light, but whose action is accelerated by light rays.[1] These X-substances must be assumed to be of four kinds, the W, R, G and B X-substances, each of which acts upon the retinal nerve-endings of the W, R, G and B retino-cerebral systems respectively. In the case of light of more than low intensity the W system and the W X-substance (which is set free in the rods only) play a part of relatively small importance and may be neglected in the present discussion. Since there are two distinct stages in the chemical processes leading to stimulation of the nerve-endings, a first stage of setting free of the X-substances and a second stage, that in which they actually excite the nerve-endings, it is obvious that R (G or B) light may cause the predominance of the activity of the R- (G or B) system in one of three ways. To avoid confusion I will speak of the effects of R light only, with the understanding that what is said of R is meant to apply to B and G equally. R light, then, might cause the activity of the R-system to predominate (1) by setting free the R X-substance in larger quantity than the B and G X-substances while reinforcing the exciting action of all three equally; or (2) by setting free the three X-substances in equal amounts but reinforcing the exciting action of the R more than that of the B and G X-substances; or (3) by exerting a more vigorous effect upon the R substance in both stages.

In all cases of coloured light not of high intensity the facts enable us to decide in favour of the third of these possibilities. That R light sets free in the rested retina more R than G or B X-substances is shown by the phenomenon of simultaneous

[1] In section iii. I neglected to point out a fact that bears out this view of the nature of after-images, the view that they are due to the action of diffusible X-substances remaining free in the retina. This fact is that a sharply bounded after-image loses its sharpness of outline and distinct parts tend to run together like wet paints, in the words of Ebbinghaus (*Grundzüge d. Psych.*, S. 420), 'Sharp corners round themselves off, regular curves become irregular, one has just such an impression as though a substantial something spreads itself out slowly into its surroundings'. This substantial something is of course the diffusible X-substances.

induction of R light. If the appearance of the R light round about a patch of R, after fixation of it for some seconds, is due to R X-substance diffusing out of the directly affected area in larger quantity than the G and B X-substances, this can only be because the former is set free in the area in larger quantity than the latter.

The proof of the selective action of R light on the second stage of the retinal process is not so simple. It consists in certain facts that show that, during continued fixation of R light, the preponderance of free R X-substance over free G and B X-substances which, as we have seen, obtains in the early stage, is not maintained, but that the free G and B X-substances become at least equal in quantity to the free R X-substance, while, nevertheless, the R sensation continues on the whole to predominate over the G and B sensations. For if the amount of free R X-substance becomes less than or only equal to that of the B and G X-substances, the continued predominance of the R sensation must be due to the R light reinforcing the action of the former more than the action of the latter. The facts that prove the relative increase of the free G and B X-substances in an area of the retina during the continued action of R light upon it are the following: (1) The induced light, at first R, loses in saturation as it gains in brightness until it becomes W or slightly tinged with G (observation xliv.); (2) the phenomena of reversal of R light to G-B or G during continued fixation, either on diminishing its brightness or on adding W light to it (observation xxxiv.) or on simple prolonged fixation (observation xxx.); for these reversals, which only occur after fixation of some duration, show that the G and B systems begin to contend more and more nearly on an equal footing with the R-system as fixation is continued, and this seems to be due to the increase of the free G and B X-substances relatively to the amount of free R X-substance; (3) the predominance, sometimes complete, of the G and B systems in the after-image of R light of medium brightness indicates the same fact.

We have next to inquire: Why is it that, although the free R X-substance is present in greater quantity at first, the G and B X-substances become, as fixation is continued, equally or more abundant? We cannot, I think, ascribe it to a fatigue of the process of setting free of the R X-substance, *i.e.*, to a using up of the available R mother-substance, for there are facts that indicate that such fatigue is not easily induced. All accumulation of X-substances in the retina must be due to an excess of the first, the setting-free process, over the

second, the using-up process. Now we find that the brighter the light fixated the brighter is the after-image and the longer its duration, *i.e.*, the greater is the accumulation of free X-substances in the retina; and, in fact, we only find indications of fatigue of the first process in the case of stimulation by excessively bright light, as by direct sunlight (see observation xxiii.). Some other cause must therefore be sought.

It is obvious that if the action of R light is more selective on the retinal processes of the second stage than on those of the first stage, the relatively greater accumulation of the G and B substances must result on continued fixation; *i.e.*, if the R, G and B X-substances are set free by R light in a certain proportion, say in the proportion 3, 2 and 2, and are used up under the influence of the R light in the proportion 4, 2 and 2 owing to the greater selectivity of its action on this process, the more rapid accumulation of the G and B X-substances must occur. Here, we have, I believe, the key to the explanation of all the phenomena, the complementary coloured after-images and the various cases of reversal of colour, that depend upon this relative increase of the free G and B X-substances. It must be confessed that we have no direct evidence for this greater selectivity of the action of coloured light on the retinal process of the second stage. The assumption is as purely hypothetical as Hering's assimilation and dissimilation processes, still, it is not the key-stone of Young's theory.

But another factor plays a part also in the production of these phenomena. Although we cannot postulate fatigue of the retinal process of the first stage, for the reasons already given, we must recognise it in the case of the processes of the second stage. In section iii., page 76, I have stated that the after-image of W light is the more vivid, in the first moments after exclusion of the light, the shorter the period of fixation, but declines in vividness the more rapidly. This can only be explained, I think, by assuming a fatigue of the retinal process of the second stage. It is true only for short fixations, ranging from about half a second up to about ten seconds, for W light of medium intensity. There seems to be a period of fixation of from five to ten seconds that gives an after-image of minimum brightness; and a longer period of fixation gives a brighter after-image, because the greater accumulation of X-substances more than compensates for the fatigue of the process of the second stage,—it seems that the first few seconds of fixation blunt as it were the first keen edge of preparedness of the tissue. To this fatigue of the

process of the second stage we must ascribe the rapid fall in intensity of the sensation during the first few seconds, when we fixate a patch of bright W light. To the question of the part played by fatigue of the retinal process of the second stage I shall return below in another connexion.

Closely connected with the greater liability to fatigue of the second retinal process than of the first is the fact that, while the amounts of X-substances that can be set free seem to be practically unlimited and to continue to increase with the brightness of the light falling on the retina, the processes of the second stage rapidly approach a maximum activity as the light is brightened, and reach a limit beyond which increase of brightness of the light does not increase the activity of the process. The former fact is indicated by the increasing brightness and duration of the after-image as the light fixated is made more and more excessively bright; the latter by the diminution in saturation of colour as the brightness of a coloured light is increased, until the activity of the second retinal process of all three systems reaches a maximum and the light is seen as a W light in spite of the preponderance of rays of one wave length. What was said above of the greater selectivity of R light, in its action on the second than on the first retinal process, holds therefore only of R light of low and medium intensity, while with increasing brightness of the R light the relation becomes reversed and very bright R light exerts no selective action on the processes of the second stage, but only on those of the first.

A corollary from this proposition is that the more intense the light the more the first retinal process exceeds the second in activity. This is directly proved by the fact that the brighter the light the brighter and the more prolonged is the after-image, for the brightness and duration of the after-image are the expression of the amount of X-substances accumulated in the retina during fixation, *i.e.*, the expression of the excess of the first over the second retinal process.

For the explanation of the complementary coloured after-image and of the phenomena of reversal of colour of R light of medium brightness we have, then, three factors, namely, cortical fatigue, fatigue of the retinal process of the second stage, and the relatively greater accumulation of the G and B X-substances.

We have further to realise that the preponderance of the retinal excitement of the R system over the excitement of the B and G systems is probably slight, even while we experience a sensation of R of good saturation. For, owing to the mutual antagonism between corresponding areas of the

cortex of the three colour-systems, any predominance of the excitement of one system in the retina is greatly exaggerated in the cortex.

After fixation of a patch of R light of medium brightness for about sixty seconds we have, then, the following state of affairs set up in the corresponding areas of the three colour-systems affected : The quantity of G and B X-substances, free in unit area of the retina, is about equal to or perhaps even greater than the quantity of R X-substance ; the second retinal process of the R system is fatigued to a certain extent and the R cortex is very considerably fatigued, while in the G and B systems there is but very little or no fatigue at either level ; the predominance of the R in consciousness is being maintained by the selective action of the R light upon the second retinal process, *i.e.*, by the greater reinforcement of the action on the retinal nerve-endings of the R than of the B and G X-substances.

If at this time the R light ceases to reach the retina the B and G systems (or one or other of them) at once predominate over the R system, because the B and G X-substances are not inferior in quantity to the R X-substance, and act upon systems relatively unfatigued as to both the cortex and the second retinal process. We see then a B-G or, in some cases, a B or a G after-image of the R light.

In the same way, if the brightness of the R light be diminished, the balance is turned in favour of the B and G systems, so that their cortical activity predominates over that of the R system and depresses it and the R light appears B-G. For, by the diminution of brightness of the R light, the reinforcement of the second retinal process of the R system is relatively diminished, and the activities of the three X-substances become more nearly proportional to the quantity of each free in the retina, as they are in the absence of light. On continuing the fixation with diminished illumination the R colour reasserts itself because, while the three X-substances continue to be used up in amounts proportional to the quantity of each present, *i.e.*, in about equal amounts, the R light continues to set free more R than G or B X-substance, and, therefore, presently restores the preponderance of the R X-substance.

In the case of reversal of colour by adding W light after fixation for sixty seconds (observation xxxiv.) we have the same factors to consider. The condition described above is produced by the fixation, namely, approximately equal amounts of R, G and B X-substances, fatigue of the second retinal process and of the cortex of the R system, and the

predominance of R in consciousness only just maintained by the greater reinforcement by the R light of the action of the R X-substance on the nerve-endings. The W light then brings an equal increment of stimulus to each of the three systems, and thereby the relative predominance of the R processes in the retina is diminished, and the activity of the R cortex yields to that of the G and B systems. The argument may appear clearer if put into a numerical form as follows: We will suppose that, the amounts of R, G and B X-substances being about equal, the R light is reinforcing their action on the nerve-endings of the three systems in the proportion of 40, 20 and 20 respectively; then suppose the W light increases the reinforcement of the action of each by 100 units, we then have 140 units of reinforcement of the action of the R X-substance and 120 of the G and of the B X-substances, the amounts of all three substances remaining about equal; if then the reinforcement of the action of the R X-substance, when twice as great as that of the G and B X-substances, was only just sufficient to maintain the predominance of the R-system, it will no longer suffice when only one-sixth greater.

On continuing the fixation of the mixed R and W light the R colour slowly returns, because with the brighter light the selectivity of its action on the second retinal process, to which the relative increase of the G and B X-substances was due, no longer exceeds the selectivity of its action on the first process in the same degree and may even be less; and the preponderance of the R X-substance is therefore restored.

In the reversal of colour on simple prolonged fixation the same factors are concerned, but the fatigue of the cortex plays the chief part, as is shown by the rapid changes and short duration of the phases of colour. We have again in the retina equal quantities of R, G and B X-substances, and greater fatigue of the second retinal process of the R system and of the R cortex, and the predominance of the R system maintained only by the greater reinforcement of the action of the R X-substance on the nerve-endings. Then, as fixation is further prolonged, the fatigue of the R cortex increases until the R cortex yields in the struggle with the B and G systems, which, though less intensely excited, have their cortical areas unfatigued—the B and G cortical areas spring into activity and inhibit the R cortex until, after a few seconds' rest, the latter is restored sufficiently to reassert its predominance over the former; and so on again and again as long as fixation is continued, the R continuing to predominate on the whole because of the greater reinforcement

of the second retinal process in the R system (observation xxx.).

We have already seen the explanation of the complementary coloured after-image of coloured light that is not very bright. Two points remain for consideration, the greater tendency of the after-image to be same-coloured after very short periods of fixation, and after fixation of very bright coloured light. The explanation of the former is obvious: During the short period of fixation the disproportionate accumulation of G and B X-substances has not time to occur, and the quantity of R X-substance will still predominate at the end of the short period of stimulation.

The explanation of the same-coloured after-image of very bright coloured light follows too from our premises. We have seen that, while at dull and medium intensities R light is more selective in its action on the second than on the first retinal process, this relation is reversed at higher intensities and the first, the setting-free process, exceeds the second, the using-up process, more and more the brighter the R light. Under the action of a R light of greater intensity than that at which the reversal of this relation occurs, the R X-substances must, then, accumulate more rapidly than the G and B X-substances and if the R light be bright enough the preponderance of the R X-substance over the G and B X-substances at the end of a period of stimulation will suffice to ensure the predominance of the activity of the R system for a time.

This result is favoured also by the fact that, on stimulation by very bright R light, the activity of the R cortex does not predominate over that of the B and the G cortex so markedly as on stimulation by less bright R light, as is shown by the less saturation of the R sensation excited by the very bright R light. The degree of the fatigue of the G and the B cortex must therefore be more nearly equal to that of the R cortex the brighter the R light fixated.

Here then we have the explanation of the apparent anomaly that, while a R light of medium brightness and good saturation is followed by a predominantly complementary coloured after-image, a very bright R light of lower saturation is followed by an after-image, in which R follows immediately and on the whole predominates over G and B. It is the explanation, too, of what appears almost paradoxical, namely, that even if the brightness of the R light be so increased that its redness is hardly perceptible, the after-image is much more R, *i.e.*, a much more saturated R, than the direct image itself.

There remain to be cleared up some points of minor importance in connexion with after-images.

In the after-images of coloured light of low intensity the colours are of low saturation, because in their case the W system plays a relatively large part, and the colour sensations are compounded with the W or grey sensation arising from its excitement; perhaps also because, the excitement of the colour-systems being of low degree, the antagonism between them is less keen and fusion of the colour-effects occurs more readily.

In the after-images of bright coloured lights the three primary colours appear bright and pure and tend to follow one another in a recurring cycle, as in the case of the after-image of bright W light, because the excitement of the systems being intense the antagonism between them is keen and the high degree of cortical fatigue is favourable to 'complete fading' of the sensation-element due to any one system.

In the case of any after-image in which the colour changes completely and suddenly, or with struggle, the change of colour does not correspond to changes in the retinal processes. It is rather that all three colour-systems are being continuously stimulated in the retina, and a delicate balance is set up between the activities of the contending cortical areas of the three systems. The balance being, by comparatively slight causes, inclined in favour of one system, that one predominates over and depresses the cortical activity of the other two; that system then tends to lose its predominance owing to the increasing fatigue of its cortex, and a very slight cause may determine its yielding to one or other of the other two systems. Of factors that tend to incline the balance in favour of the colours complementary to the light fixated, the presence of a sharp margin to the patch of light fixated (observation xlii.) and the projection of an after-image upon a W surface (observation xliii.) are important, as was shown above. The sharp margin favours the production of a bright halo around the after-image, and, in the case of a fixation of medium duration of light of medium intensity, the halo is of the colour of the light fixated, and, therefore, owing to the contrast-effect exerted by it, favours the predominance of the complementary colour in the after image.

In considering the effect of projection in favouring the appearance of B and G in the after-image of R light we must distinguish between after-images with and those without a halo. In the case of the latter, the effect seems to be

due to the fact that the second retinal process is more fatigued in the R system than in the other two, or in other words, the retinal nerve-endings of the R system are more fatigued and react less readily than those of the G and B systems to the reinforcement of the action of the X-substances by the light from the W surface. In the case of an after-image of R light having a R halo, or rather a halo due to diffused X-substances among which the R X-substance preponderates, projection still further favours the appearance of B and G in the after-image, because it reinforces the R halo and so increases its contrast-effect; and it reinforces the halo more than the after-image itself because in the area of the halo there are not only additional X-substances present, as in the area of the after-image, but the second retinal processes are not fatigued as in the after-image area, or but very slightly so. And we have seen (observation xlv.) that this reinforcement of the halo on projection may be so marked as to cause it to predominate very markedly over the after-image.

It is usual to class together the after-images of coloured light seen in the dark and those seen on projection on to a W surface, and to speak of them both as the expression of a state of adaptation of the retina. We should I think distinguish between the two classes of after-image, for although the same factors are concerned in both, the one factor, the presence of X-substances in the retina, is the essential feature of the former, and the other factor, the fatigue of the retinal nerve-endings, *i.e.* of the second retinal process, of one or other colour-system is an important and may be the sole factor in the latter class. The propriety of this distinction is illustrated by the following observation :—

Observation XLVI.—Direct sunlight transmitted through two sheets of G gelatine, one plate of ground-glass and a shaded disc of milk-glass gave a G shaded disc of fair brightness. Fixations of this disc, lasting ten, twenty, thirty and forty seconds, were followed in the dark by P after-images that lasted about thirty, thirty-five, forty and fifty seconds respectively. In each case, as soon as the after-image was no longer visible in the dark, the eyes were directed towards a surface of W blotting-paper of fair brightness, and in no case was any after-image then perceptible. Fixation of sixty seconds was followed in the dark by a P after-image that faded away completely after fifty seconds and could not be revived in the dark, but, on then directing the eyes to a sheet of W blotting-paper as before, a P disc was visible for forty seconds. In the same way fixations of ninety seconds, two

minutes and three and a half minutes were followed by P after-images that died away and could not be revived in the dark after about fifty seconds, but on turning the eyes to the W surface a P after-image was visible for seventy seconds, two minutes and seven minutes respectively.

With prolonged fixation, then, of coloured light the retinal nerve-endings (*i.e.*, the second retinal process) of the system of that colour become fatigued, and this fatigue passes off only very slowly and expresses itself as a complementary coloured after-image on turning the eyes to a W surface, long after the after-image, visible in the dark and due to the presence of free X-substances, has ceased to be visible. It is to this condition that the name 'adaptation' should be given, while the presence of X-substances determines the true after-image. I see no reason to reject the view that a gradual recovery from fatigue of this kind affecting the retinal nerve-endings of the W system is the chief factor in retinal adaptation for vision in dim light.

Section VII.—Conclusion.

The Seat of the After-image.

The question of the seat of the after-image has been much discussed, and although it is now, perhaps, generally said to be in the retina there are still some supporters of the view that it is in the brain. What has gone before will have made it clear that, as might be expected under these circumstances, both views are partially true. The material basis, the active chemical substances, on which the sensation ultimately depends, have their seat in the retina, while the predominance of one or other part of the after-image itself (in the sense in which the word is used in these pages) or its halo, and of one or other of the colour-systems is largely determined in the cortex.

Without attempting to discuss here the nature of these cortical events, which concern the physiology of attention rather than of vision, I will bring together here some facts that show the importance of the part played by the cortex: (1) The tendency for well-defined and homogeneous parts of a complex image, whether a direct image or an after-image, to undergo 'complete fading' and revival in consciousness as independent wholes, as illustrated by observations iii., iv. and xv.

(2) The fact that when two images are fixated succes-

sively and so as to fall partially upon the same area of one retina, each forms an after-image distinct and separate from that of the other, so that the two after-images may appear simultaneously or alternately in consciousness. This fact is illustrated by the following observation :—

Observation XLVII.—A plate of ground-glass was put over a rectangular hole, 20 mm. by 10 mm. in a sheet of cardboard. This, held up before a lamp flame, appears as a strip of bright W light on a dark ground. I held it so that the strip of light was vertical and fixated a point at the centre of the strip for five seconds, and then quickly turned it until the strip was horizontal and again fixated the point at its centre for five seconds. On then excluding all light the two positive after-images appeared successively, each complete and distinct from the other and appeared and disappeared, alternating with each other several times; then for some seconds both were visible together, forming a W cross, until one faded again and they again alternated.

(3) When an after-image is projected upon a not too bright surface it is not always modified at once by the effects of the light from this surface, but may maintain itself in consciousness unaltered for a certain length of time, as in the following case :—

Observation XLVIII.—I put in the dark cabinet between a plate of milk-glass and the photographic shutter a sheet of cardboard having a square hole in it about 8 cm. in width, so that on opening the shutter a bright W square appears. Over the milk-glass I pasted dark cloth, leaving uncovered a circular patch about 10 cm. in diameter and concentric with the square hole in the cardboard on the other side of the plate. Dim daylight illuminated the interior of the cabinet so that the uncovered part of the glass plate appeared as a disc of dull W on a dark ground. I opened the shutter and fixated the centre of the bright W square for ten seconds and then released the shutter, so abolishing the bright square, while keeping the eyes unmoved. Then although the image of the dull W disc was falling upon my retinæ, it did not affect consciousness at once, but for about five seconds I saw a dull W square, the after-image of the bright one, and then the image of the W disc appeared quite suddenly, popped up into consciousness as it were, and the after-image remained as a dimly defined area upon it.

These facts show that, apart from the after-effects in the retina, the fixation of any patch of light throws the cortical areas affected into a state of preparedness to function again, or to continue to function, in the same way as during the

action of the light, and that this tendency of the cortical areas may override and obscure changes initiated in the retina. They seem to me especially interesting because we seem to have in them the simplest possible manifestation of that which distinguishes the brain as an organ of reproduction of impressions from a mere photographic plate, namely, its tendency to reproduce separately the impressions made upon it at different moments of time; and also because we seem to have in them experimental proof of what on general grounds we are bound to assume, namely, that the same neural elements must take part in the storing of many different impressions, and that the essential fact of reproduction of an impression is that the neural elements, that were once thrown into a functioning group by the incidence of an external stimulus, tend to function again as the same group.

It is then not proper to say that an after-image has its seat either in the retina or in the brain; both retain an impress from the original stimulation, and though the persistence of the exciting substances in the retina is perhaps the more important element, yet the cortical impress plays a large part in determining the exact form in which the after-image shall appear.

The Compound Nature of the Sensation of Yellow.

To regard the Y sensation as compound in character is not of course essential to Young's theory, or rather, it is not essential to the theory that W results from psychical fusion of the colour-sensations. Müller, however, holding that his doctrine of colour-series proves the simplicity of the Y sensation, has advanced very convincing arguments against any form of the theory assuming the composition of W from four simple sensation-elements.[1] Müller's doctrine of colour-series certainly puts much more forcibly than had been done before the argument from immediate perception for the simplicity of the Y sensation. But the force of it seems to be completely shattered by the fact, pointed out by Mrs. Franklin,[2] that the R and the G, that must be selected as approximately pure or simple R and G by the use of the method of colour-series, are not a complementary pair. I have convinced myself of the truth of this in my own case by the following procedure:—

Observation XLIX.—I chose a sheet of gelatine that seemed, when held against a dense white fog, to be a pure G, and

[1] *Zeitsch. f. P. u. P. d. S.*, Bd. xiv., S. 327.
[2] *Psych. Rev.*, vol. viii.

with this I mixed, by the method of reflexion in a glass plate, a R of such a tone that it was possible to obtain a perfectly neutral mixture, the R light being also given by the light from the fog, transmitted through a sheet of R gelatine. I then included each of these in a colour-series reaching from B-G to P, the colours being given in all cases by the light from the white fog, transmitted through coloured gelatine. It was then quite clear that while the G was as nearly as possible a pure G, the R was not a pure R, but contained some B. And when I repeated the experiment in the reverse order and chose, from a series of G gelatines, a pure G and, from a series of R gelatines, a pure R (using in this case newly fallen snow as a background) and mixed the G and the R so chosen by reflexion in a glass-plate, the mixture appeared a yellow of good saturation.

This being the case, the method of colour-series does but furnish additional strength to the opinion, necessarily entertained by those who accept Young's theory, that it is impossible to determine from the character of a sensation that the physiological process underlying it is simple and that the sensation is not the result of psychical fusion of the effects on consciousness of two or more separate physiological processes. While admitting that Y does make the impression of simplicity in a greater degree than P or B-G, I think it is sufficiently proved that this impression is not a reliable ground of opinion by the fact that, of many persons competent to form an opinion, those who incline to the one theory usually adhere to the one view, and those who adopt the other theory to the contrary view of the matter. I can very distinctly remember that until I began to study physiology I regarded G as a mixture of B and Y, and felt that I could see both colours in any tone of G. It is true that this was probably due to my having been accustomed as a child to mix B and Y paints to make G; but this illustrates very well the psychological complexity of the factors that lead us to judge a colour tone to be simple or complex.

There seems to be no evidence for the simplicity of the physiological process underlying the Y sensation other than this vague and unreliable dictum of consciousness, whereas against it we have the following array of facts:—

(1) When I choose a pure R and a pure G by the method of colour-series and mix them the mixture appears Y (observation xlix.).

(2) If patches of R and of G light be thrown upon one area of one retina they may, under suitable conditions, show the phenomenon of struggle as well as of fusion, *i.e.*, at one

moment they may appear as Y, at another the R or the G may alone affect consciousness, thus proving that the actions of the R and G rays in the retina are not mutually antagonistic or destructive, but that they proceed side by side in the one area of the retina (observations xxvi., xxvii.).

(3) On fixation of a bright Y light it becomes after a few seconds a bright pure R or a bright pure G or shows struggle of R and G (observation xxxiii.).

(4) In the after-image of very bright light, whether W or Y or other coloured, Y never appears except as an incident in the struggle between R and G, just as P occurs as an incident in the struggle of R and B; *i.e.*, it appears only where G is struggling upon and yielding to R or R is struggling upon G and it never appears, as do R, G and B, forming one of the phases of constant colour of the recurring cycle R, G, B, R, G, B.

(5) On diminishing the illumination of a patch of Y after fixating it for thirty seconds or more, it usually becomes R unless the period of fixation has been considerably prolonged, when it usually becomes B.

(6) The after-image of bright Y light may be Y in the first phase, but this Y always resolves itself into G struggling upon R as in the case of an initial Y phase following bright W light. In the after-image of less bright Y light B usually appears, but R and G usually predominate.[1]

I will bring this paper to an end with a summary of the phenomena described in it, that the theory of Gegenfarben, whether in the form given it by Hering or in that given it by Müller, is incapable of accounting for:—

(1) The occurrence of the sense of absolute darkness or blackness in the absence of any stimulation by W light that could produce it by simultaneous or successive contrast (observation iii.).

(2) Simultaneously induced light appearing:—

(*a*) on a ground that has shown no previous contrast effect (observation xx.);

(*b*) almost or quite as bright as the inducing light (observation xx.);

(*c*) failing to appear on a ground on which a marked contrast is produced (observation xl.).

(3) Binocular contrast, whether of W or coloured light (section iii., p. 88).

[1] I refer here to an after-image observed under simplified conditions as described above, *i.e.*, one in which complication by halo and projection is avoided.

(4) Binocular fusion of complementary colours to give a W sensation.[1]

(5) Certain features of monocular contrast :—

(*a*) the total inhibition of a patch of colour by bright W light falling on an area of the retina at some distance from that affected by the coloured light (observation xxxix.);

(*b*) the inhibition of colour of low saturation by a W ground (observation xxiv.);

(*c*) the fact that contrast only appears as a modification of an existing sensation (observation xxxviii.).

(6) Positive after-images in general :—

(*a*) The phenomena of 'farbiges Abklingen' of the after-image of W light in particular, with its recurring cycle of phases of pure and highly saturated R, G and B (observations xxxv., xxxvi.);

(*b*) The fact that fixation of W light is invariably followed by an after-image brighter than the ground, if the conditions that lead to the production of a relatively bright halo are avoided (observations xvi., xvii., xviii.);

(*c*) The same-coloured initial phase of the after-image of all very bright coloured lights (observation xli.);

(*d*) The frequent appearance of a same-coloured phase in the after-image of less bright coloured lights (observation xli.).

(7) The variety of colours that may appear in the after-image of any light save the dullest that will give any after-image, *e.g.*, pure B phases in the after-image of R light (observation xli.).

(8) The array of facts indicating that the Y sensation is due to psychical fusion of R and G (p. 378).

(9) The reversal of the colour of a fixated patch by addition of W light (observation xxxiv.).

(10) The reversal of the colour of a patch of light during simple prolonged fixation (observations xxx., xxxi.).

(11) The appearance of colours of fair saturation during simple fixation of bright W light (observations xxix. and xlv.).

(12) The monocular struggle of complementary colours during which they fuse at moments to give W and at other moments appear separately in consciousness (observation xxviii.).

[1] (3) and (4) are only to be reconciled to the theory of 'Gegenfarben' by assuming, in the face of strong evidence to the contrary, identity of the cortical areas for the two eyes, as pointed out in section v.

(13) The fact that a W image, produced by monocular fusion of two complementary colours, may be followed by an after-image, the character of which proves that the rays of either colour have produced throughout the appropriate cerebro-retinal colour-systems their specific effects, and that, therefore, there has been no mutual destruction or interference of their physiological effects.

I have reserved the description of this last phenomenon because it will serve to clinch the argument against the theory of 'Gegenfarben'.

Observation L.—Two rectangular oblong holes were cut in a sheet of cardboard, as in the case of observation xxvii., the long axes of the two being at right angles to each

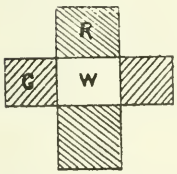

Fig. 22.

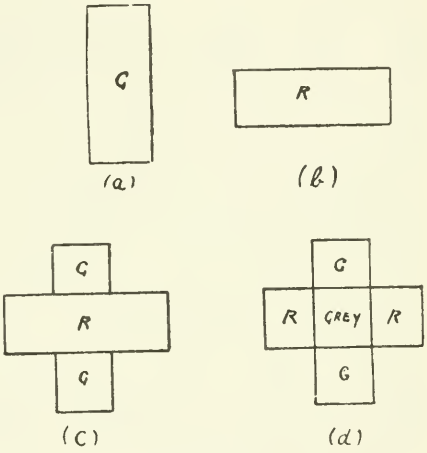

Fig. 23.

other. The one was covered with a sheet of R, the other with a sheet of G gelatine (both tinged with B), and a plate of ground-glass was put over both. This arrangement was fixed over the aperture of the dark cabinet so that the light from a bright sky, coming through the holes, caused them to appear as bright rectangles of G and R on a dark ground. The fixation of the G or the R rectangle alone was followed by a R or a G, *i.e.*, a complementary-coloured after-image in either case. By means of a glass plate, held at right angles to the plane of the cardboard, I then threw the reflected image of the one across the direct image of the other, and fixated a point at the centre of the combined image, maintaining my accommodation to a moderate degree. The square

formed by the coinciding parts of the two images then appeared W continuously throughout the fixation as in figure 22. On excluding all light from the eyes, after-images of the forms and colours denoted in figure 23 succeeded one another; the after-image of either of the coloured rectangles appeared at times complete in form and colour just as when that rectangle was alone fixated, and these two complete complementary-coloured after-images alternated several times with one another in consciousness. When they were present to consciousness simultaneously the common square area appeared sometimes a dull yellowish grey, sometimes in the colour of one of the after-images only, as in figure 23 (*c*).

This observation seems to prove incontestably that in the common square area, which in the direct image appeared W, the R light and the G light had produced each its own specific effects, exactly the same effects as when either works alone upon the retina, and that they had not in any sense or manner prevented each other from producing those effects. I have observed this alternation of the two complementary after-images many times after fixations of various durations.

There is then a very large number of striking phenomena of fundamental importance that cannot be accounted for by the theory of 'Gegenfarben,' and many of them are absolutely irreconcilable with any form of that theory.

Young's theory, on the other hand, if we incorporate with it the hypothesis of the separate W-exciting apparatus having its retinal seat in the rods, as urged by v. Kries, Rollet's theory of contrast and the theories of induction and after-images set forth above, explains fully all the phenomena described above; and, with the exception of certain observations of a complex character, very difficult to interpret, such as Müller's experiments on galvanic stimulation of the eyes and some of Prof. Sherrington's flicker experiments, I cannot discover any important fact connected with light- and colour-vision with which it is incompatible or that it fails to illumine.

V.—CRITICAL NOTICES.

ΑΡΙΣΤΟΤΕΛΟΥΣ ΠΕΡΙ ΨΥΧΗΣ. *Aristote: Traité de L'Ame*, traduit et annoté. Par G. Rodier, Maître de conférences à la faculté des lettres de l'Université de Bordeaux. I. (Texte et Traduction) pp. xvi. + 263. II. (Notes) pp. 585. Paris: Ernest Leroux, 1900.

Aristotle's Treatise of the Soul may be regarded from points of view so divergent that what the would-be commentator is most sure of is that he must at least disappoint some types of requirement. Hence it tends to find a commentator but rarely. The available material, whether in the shape of better texts of the Greek paraphrases or in the more elusive form of programmes and degree-theses, articles, studies and notes, grows apace. But few are equally learned in Aristotelian and general philology, in the tradition of the Greek philosophical schools, in the history of mediæval interpretations of Aristotle, and in scientific psychology. And no one cares to meet a criticism of which the gist is that he is not omniscient. If we leave out of account editions like that of Torstrik, with its wholly admirable, if inconclusive, treatment of textual problems, and put out of court Edwin Wallace's able but misguided interpretation of the oracles in the interests of idealist edification, the fundamental edition of the *De Animâ* is, as M. Rodier says, still Trendelenburg's. Of this the groundwork was laid considerably more than half a century ago, while Belger's revision has for some time attained its majority. If Trendelenburg's learning had been equalled by his insight, he yet could not have availed himself of data which in his day did not exist.

The general difficulty of the conscientious annotator was not lessened by the emergence of the facts upon which Torstrik founded his textual theory. But the conservative reaction of Biehl towards the traditional text, and the extent to which Essen's rewriting of the treatise may be taken as evidence of the insolubility of the textual problem have recently freed students from the obsession of the philological sending. In all essentials the text commented by Alexander and Themistius is that which we have. It was this that exercised so extended an influence in the later middle ages. If there lies behind it something earlier and simpler, purer and shorter, this is at any rate irrecoverable.

It was to be expected that a commentator would arise on the

lines of the reaction, to make an attempt in the following of Trendelenburg rather than of Torstrik to bring to a focus the more recent literature dealing with the *De Animâ*, and to offer a revised, if possibly reactionary, interpretation.

Any considerable measure of success in his endeavour was certain to assure a welcome. M. Rodier's commentary is more than moderately successful. It is, we venture to think, indispensable. Where he is wrong, it is at any rate he himself who supplies most completely the materials for his discomfiture. Given his point of view, his notes mark a decisive advance on the other commentaries of the nineteenth century. His point of view is one which necessarily must have found an exponent. Equally it requires but one. His annotations, so far as they are bound up with his point of view, are unlikely to be superseded.

M. Rodier offers an ultra-conservative text and a defensive *apparatus criticus*. He supplies a translation directed to the giving of a sense based for the most part on a tradition elicited from the Greek commentators. His commentary is full and elaborate. If it owes most to Alexander and Simplicius, Themistius and Philoponus, it takes full cognisance not only of nineteenth century editors but of all that fugitive literature to which a *Jahresbericht* might call the periodic attention of a for the most part unheeding public.

M. Rodier gives no introductory essays. There is no appraisement of Aristotle's doctrines from the standpoint of newer psychology. There is no attempt to decide for empiricism or apriorism. There is no arbitrating between opposed views as to the nature of the imperishable νοῦς, no holding of the scales for Alexander, Averrhoes, and St. Thomas. *Nous n'avons pas abordé ces questions.* "To interpret the treatise otherwise than in its detail and to resolve in a determinate sense problems on which Aristotle himself has neglected, of set purpose perhaps, to pronounce himself in a precise and definite manner, it would have been necessary to give somewhat arbitrarily a preference to certain tendencies and texts at the expense of certain others, and to disfigure somewhat a work whose physiognomy it was intended to reproduce exactly." It is exegesis of the *De Animâ* that M. Rodier offers, and nothing else. His intention he sums up by styling his volumes a *traduction justifiée.*

M. Rodier has chosen for his motto that passage in Plato's *Cratylus* where after the licence of free conjecture Socrates pulls up himself and his companions with a condemnation of the easy principle of adding a letter here and taking one away there at will, and calls for an arbiter and a standard. M. Rodier is against Essen, and on the whole against Torstrik, though not against the facts adduced by the latter, which he acknowledges by printing the principal variants of E in book ii. as an appendix. He will not admit a doublet unless clear necessity is shown. He follows Biehl upon the whole, with a rejection of most of that editor's

emendations. It is indeed worth while to see for once whether the text avouched by manuscript authority will give a sense. A favourable specimen of M. Rodier's attempt is book iii., chapter vi., where, at the expense of a mistranslation of ἤ and a slight emendation of the text on his own account, he finds himself able to dispense with a variety of conjectures, including a quite certain one of Prof. Bywater's.

M. Rodier's critical *apparatus* is derived from Biehl. He has himself gleaned something from a fresh collation of E. The use made in this *apparatus* of the Greek paraphrases for purposes of text involves some neglect of proper canons. Quotations other than the shortest, whether as headlines or embedded in the metaphrase, have seldom escaped revision, and have the value of quite late manuscripts only. Inferred readings are often of far greater value, and should always be distinguished, though they rarely prove a point to demonstration. The textual evidence of the Greek commentators should be completely harvested or not at all. Taking haphazard iii., 4 with Themistius' paraphrase, our record against M. Rodier is as follows: in 429 *a* 14 Themistius, as well as the commentators cited, reads τι. In 15 Themistius is quoted for ἄρα: he actually says τοίνυν in one place, and in another while using ἄρα he adds at the end of the clause τὸ νοητικόν. In 20, if Themistius' version is to be followed, as it is by M. Rodier, we must either punctuate a parenthesis above or emend the text. In 429 *b* 1 one manuscript of Themistius reads ἤ before τῶν μικρῶν ψόφων. In 3 Themistius omits τι twice, though Heinze in one place supplies it from the text of Aristotle! In 8 καὶ τότε is inferred from Themistius' καὶ τηνικαῦτα. In 23 the *non legisse videtur Them.* is too strong. It is simply indeterminate.

M. Rodier's translation is of the essence of his scheme. He admits to having sacrificed deliberately all attempt at grace in his desire to keep close to the thought of Aristotle. He admits, what is more serious, the sacrifice of *correction grammaticale*. The latter jettison is made under the assumption that it implies *outrecuidance* to maintain that a Themistius or an Alexander knew less well than we do the language or doctrine of Aristotle. And yet the modern Englishman who should read with interest and expound with intelligence his Chaucer or Beowulf might yet bow to the German expert in oldest English and kindred speeches. There is always the possibility too that your Greek commentator felt the difficulty, knew that he was explaining against the grammar, and yet was reduced to it like the poor modern. The translation designed on these lines is gruesome enough. The use of brackets for added words is somewhat haphazard. Where the words are necessary to the sense the brackets are superfluous. Where the words are not necessary, it is the words that are superfluous.

As an example of bad translation we may cite the last clause of i., 1. *Or nous disions que les états de l'âme* [*ne peuvent*] *pas non plus* [*être regardés*] *comme séparables de la matière physique*

des animaux et que, par conséquent, c'est en tant que leur corps ou leur matière possèdent telles qualités, que le courage ou la crainte se réalisent en eux, et qu'il n'en est pas [pour ces états,] comme pour la ligne et la surface. Or 427 *a* 14. M. Rodier is not sound as to the use of the article, 409 *b* 1, 414 *a* 17, 418 *b* 28. He occasionally blunders: στρατηγεῖν is not *porter les armes ;* τε cannot give *par suite,* 424 *b* 26. He is sometimes misled by the Greek paraphrases, as *e.g.* by Philoponus to translate τὰ ἀκολοθοῦντα καὶ κοινὰ *les sensibles derivés et communs.* M. Rodier sometimes translates against his own views as expressed in a note, 427 *a* 22, 414 *b* 9. In 431 *a* 29 he translates the reading he rejects. We cannot accept τόδε τι *une forme substantielle,* or εὐθύνας δεδωκυῖα *en guise de châtiment,* despite of notes justificatory. Nor λόγος *pensée discursive,* when it is in the context said to include definitions as well as demonstrations. Nevertheless, though M. Rodier's translation will not stand beside that of Bonitz for the *Metaphysics,* it on the whole serves its purpose. We know how M. Rodier takes every word. Entire chapters are excellently done. In rejecting emendations based on the logic of the argument M. Rodier has so handicapped himself that, taking this with his overestimate of the Greek commentators, it is more wonderful that he has succeeded so far as he has done than that he has slipped once and again. Only we take it that his commentary justifies his translation in a different sense to that which he supposes.

The commentary is excellent. It gives too much weight to the consensus of the Greek commentators. In default of a definite passage in Aristotle to be adduced in arrest of judgment, it is assumed to prove a tradition of the school. But the later did use and borrow from the earlier, and the last—Sophonias—is nearer in date to M. Rodier than to Alexander. Except as regards the *Timæus* the Platonic antecedents of the *De Animâ* are perhaps underestimated. On the other hand M. Rodier makes admirable use of Aristotle himself as his own commentator, in particular of the *Physics.* He can bring in a decisive quotation from Met. Δ 6, to settle the meaning of the metaphor of the bent line and the straight (iii., 4) once and for all. He is far fuller than his predecessors on the 'common sensibles' and on the relation of 'common' to 'primary and undifferentiated,' κοινὸν to πρῶτον. Of what M. Rodier can do with the Greek commentaries a favourable specimen occurs i., 1, 402 *b* 7, where, resting on Alexander, he gives a convincing interpretation of the famous statement that 'the universal animal is either nothing or subsequent to man and horse'. We are dealing with the soul which has no κοινὸς λόγος, since there are stages ἐφεξῆς from the nutritive up to the thinking soul, each higher requiring the lower as indispensable condition, but not conversely. Now the soul is not a genus of which the human or rational soul is one species and the plant's life of nutrition another, not yet is it merely used equivo-

cally of the plant, soul and 'noetic consciousness'. It is as if animal species were grouped serially on a scale. Then ζῷον which, as it is, is a genus and logically prior to the species in which it is determined to particular existence, would be either an equivocal term and in reality nothing, or it would be subsequent to the determinate groups. Soul is subsequent as animal would be on this hypothesis. Thus disappears one of the stock quotations to prove Aristotle's nominalism. In notes like this M. Rodier patiently unravels a meaning which was practically lost. In others the cumulative effect of passages singly inconclusive determines the result. Everywhere one is certain of having the data presented fully, and of a sober exercise of judgment in summing up.

M. Rodier has no dogmas to find support for, except the prerogative authority of the Greek commentators. He is of the true temper for successful exegesis. The theory of development in Aristotle's doctrine of perception from the formula which makes it receptive of form without matter to that of δύναμις and ἐνεργεία has no attraction for one who realises with M. Rodier that the δυνάμει αἰσθητόν is ἐνεργείᾳ τόδε τι. The always truthfulness of our perceptions of the 'proper sensibles' is not perverted to mean that in subjective reference every experience is real, while error is wrong reference to objective reality, but gets its right meaning and the right explanation of the qualification of the 'always'. There is no modernisation. There is no attempt at 'sympathetic development'. What Aristotle ought to have meant is never alleged in order to be enforced as what he must have meant. It is because of this that M. Rodier's account of sense-perception and again of νοῦς is such a model of exegesis in detail—and so disappointing to all who are sure that Aristotle could not have left a dualism untranscended, and who are clear that the νοῦς ποιητικός which they do not find in Aristotle, must mean 'the universal consciousness' or what not. M. Rodier's notes on νοῦς —and in particular the central note—can only leave the student less certain rather than more certain, but this only because the passages are grouped and commented and allowed to communicate their own ambiguities and difficulties. And to think that had there been but one passage, and the Greek commentators agreed about it, M. Rodier's canon as to the tradition of the school would have compelled him to a dogmatic solution!

In the historical portions of book i. M. Rodier has made good use of Zeller and of Martin's elucidations of the *Timæus*. Elsewhere he seems to have learnt most from Bonitz, whose *Metaphysics* seem to have been his model, as the same writer's contributions to the interpretation of the *De Animâ* both in special studies and in the *index Aristotelicus* are his most carefully sifted material. And Trendelenburg is 'fundamental'. This implies a limitation to certain aspects only of what is of interest in regard to the *De Animâ*. We need notes which shall do as

much for the Latin commentators as M. Rodier does for the Greek. They, too, represent 'the tradition of a school' (though doubtless not *the* school) which is well worth preserving. We want a commentary that shall not be afraid to say something of Averrhoes. We should be glad of a translation and commentary such as Dr. Ogle has given of the *De Partibus Animalium* for another side of the subject. A historian of philosophy who thought it worth while to explain clearly and in brief how τὸ δυνάμει αἰσθητὸν got transmuted into 'permanent possibility of sensation,' or how αἴσθησις κατὰ συμβεβηκός in one of its senses helped out the construction of Berkeley's Theory of Vision, would also have a lesson for us. But before all these comes exegesis of the text as it stands—as if it were verbally inspired. In this M. Rodier approaches to the ideal far more nearly than any other modern editor, the 'fundamental' Trendelenburg not excepted.

M. Rodier is not free from mistakes. His use of the epithet 'practical,' for example, in reference to the νοῦς of Anaxagoras (p. 52) is singularly unfortunate. He, to our thinking, somewhat confuses the doctrine of the 'common sensibles' as presented in iii., 1, not only by his perverse rendering of καὶ τοῖς ἰδίοις but also by taking the movement by which we perceive them as the movement which they produce in us. And these are but instances. If, however, the notes could shake themselves free of the insidious influence of his fatal canon as to 'grammatical correctness'; if they could be somewhat condensed, so that obvious translations were not thought to need the support of quotations from Philoponus—'the bore,' or even from Sophonias; if the Greek commentator were reduced to his proper perspective, and if copious indices were supplied to notes as well as to text, M. Rodier's second edition would take a high place, as this already must in a less degree, among the better contributions to Aristotelian exegesis, fit though few.

M. Rodier's printer suffers from a distressing malady which has led to the inversion of τ and θ at least seven times in the one word συνθετὸς.

HERBERT W. BLUNT.

Experimentelle Beiträge zur Lehre vom Gedächtniss. Von G. E. MÜLLER and A. PILZECKER.

THIS volume of three hundred pages appears as the first 'Ergänzungsband' of the *Zeitschrift für Psychologie und Physiologie der Sinnesorgane.* The authors report and discuss the results of work carried on in the psychological institute at Göttingen to supplement and extend the earlier work of Prof. Müller and Dr. Schumann, published in the sixth volume of the same journal under the title 'Experimentelle Beiträge zur Untersuchung des

Gedächtnisses'. It will be remembered that that work was in turn a carrying farther of the method of Prof. Ebbinghaus, by the help of various refinements of procedure, especially a more careful method of building the rows of nonsense syllables and the presentation of them to the subject successively and with great regularity by means of a horizontal revolving cylinder driven by accurately regulated clockwork. In that earlier work the method chiefly used was to determine how many repetitions of the reading of a row of twelve syllables was necessary to the learning of it, the syllables being either new or in some degree familiar either in the same or other orders of succession and association.

In this recent work, which was extended over a period of eight years, some half-dozen subjects, besides the authors, took part. Rows of nonsense syllables, prepared and presented with the same care and elaborate precautions as in the earlier work, were read aloud by the subject. A row was not, as in the earlier work, read again and again until the subject could repeat it without hitch, but each row, consisting in most cases of eight syllables, was simply read a certain number of times, with trochaic rhythm, *i.e.*, the first, third, fifth and seventh syllables being accented. After a given interval each accented syllable was again presented to the subject singly, and he was instructed to speak as rapidly as possible the succeeding syllable of the row; the association between the two syllables of each pair in this order was called the intentional association, while any association formed between the accented syllable and any other of the row than its immediate successor was called a 'Neben-association'. This, which the authors designate as the procedure by hits (*Treffer-verfahren*), was the basis of the many series of experiments recorded. The presentation of the individual syllables was so arranged that the time intervening between the moment at which the written syllable became visible to the subject and the moment at which he began to speak the associated syllable could be accurately measured in every case. The apparatus for this purpose was somewhat complicated, but consisted essentially in a small horizontal cylinder on which the syllables were written in order, a falling screen with a slot through which one syllable became visible on the falling of the screen, an electric circuit passing through a Hipp chronoscope and so arranged as to be opened by the fall of the screen and closed again by a lip-key released by the subject in beginning to speak. If no syllable came to the mind of the subject with a feeling of rightness he, according to his instructions, spoke the word 'Nichts' as soon as he felt that a further search for the right syllable was useless, and this time was also measured. The results of a series of such experiments were then tabulated as the number of right and false hits and of null-cases, and the average time was given for each of these.

The first subject investigated was the relation of the reproduction-times to the strength of the associations, the latter being

varied by varying the number of the readings of the syllable-row from three to eighteen, and the intervals between the reading of the rows and the presentation of the single syllables from two minutes to twenty-four hours. The most interesting of the results yielded by analysis of the figures were as follows: The stronger associations, which give a larger percentage of right hits and smaller percentage of false hits and null-cases, give a shorter average reproduction-time; the associations of shorter reproduction-time remained effective (*überwerthig*) for longer periods than those of longer reproduction-time; older associations that give the same percentage of hits as newer ones yet require a longer reproduction-time.

The very interesting third chapter deals with what the authors call 'Perseverations-tendenz'. By this term, borrowed from mental pathology, they denote the tendency of syllables once read to rise freely to consciousness without any apparent reproducing association. In some subjects this tendency was manifested very clearly in the intervals between reading the row of syllables and the experiments on their reproduction, and some, although instructed not to think of the syllables during this time, could not prevent their rising to consciousness even when they occupied themselves with some light mental work. In other subjects this tendency was very much slighter. The tendency, if strong at first, declines very rapidly in the course of the first few minutes. This was found to account for the large proportion of syllables which were brought up by 'Neben-associationen,' when the reproduction took place within a few minutes of the reading of a row, for, owing to the strong tendency of the various syllables to rise to consciousness, these feeble associations were of effective strength during these first few minutes. The authors point out the similarity between this tendency and (1) the working of the sensory-memory, the repetition-sensations occasionally experienced after long occupation with some one kind of sensory impression; (2) hallucinations of sense, (3) the motor-disposition (*Motorische Einstellung*), (4) the persistent recurrence of melodies, (5) the pathological recurrence of words in unsuitable connexions. In Prof. Müller this tendency was found to be very strong while the strength of the associations between syllables was in him comparatively slight; in the case of the professor's wife the converse was found to be true, the associations were strong and the 'Perseverations-tendenz' feeble. The working of these two types of memory in the daily course of life is displayed in an interesting manner, and it is pointed out how, while the mind with strong associative power is suited to practical occupations, such as administrative work, the mind with strong 'Perseverations-tendenz' is best suited for the working out of theoretical problems, this tendency being the basis of our capacity for the pursuit of ideal ends.

Chapter iv. treats of the interaction of simultaneously active

reproduction-tendencies. While consciousness can entertain only one image (in the case in hand one syllable) at one time, yet any given image (syllable) may be associated with several others. What then are the laws according to which such contending reproduction-tendencies work? The authors point out that two facts only in this most important field of inquiry are established: (1) two feeble associations may supplement one another, thus if *a* and *b* be both associated with *c*, but either one too feebly to reproduce *c* when presented alone, then if *a* and *b* be presented successively *c* may be reproduced: (2) Müller and Schumann had shown in the work mentioned above that a syllable already associated with another is less easily associated with a third than is a new syllable. For the further investigation of these laws many series of experiments were made, of which the type may be represented as follows, in a form much simplified by leaving aside the most careful precautions for securing truly comparable effects; —let each letter represent a syllable, then two rows of syllables are constructed thus:—

a-b, c-d, e-f, g-h.
i-j, c-k, l-m, g-n.

The syllables *c* and *g* occur as accented syllables in both rows. The former row is read twelve times, then the latter row is read three times, and then the accented syllables of the former row *a*, *c*, *e* and *g* are presented in turn to the subject. It then appears that the syllables *c* and *g* give a smaller percentage of hits than *a* and *e* and their average reproduction-time is longer, so that the feeble associations formed by *c* and *g* with *k* and *n* respectively in the reading of the second row three times seem to diminish the effectiveness of their stronger first-formed associations with *d* and *h*. Such a hindering effect the authors call 'effektuelle Hemmung'.

By ingenious modifications of experiments of this type, all carried out with extreme precautions for the isolation of the influence of the factor to be studied, the authors were able to distinguish, besides the 'effektuelle Hemmung' (the mutual interference of two reproduction-tendencies), a 'generative Hemmung,' a hindrance to the formation of a new association exerted by one already formed; thus if *b* is associated with *a* then *a* cannot form a new association with *c* so readily as a new unknown syllable does. The 'generative Hemmung' can only be distinguished from the 'effektuelle Hemmung' by introspection during the reading of the syllables. Another aspect of the factor that makes itself felt as the 'generative Hemmung' is the 'associative Mit-erregung'; — when an association has been formed between two syllables, *a* and *b*, and the syllables *a-c* then occur in a syllable row it is found that on the reading of this row the *a* frequently recalls *b* to consciousness and so refreshes the association *a-b*, and evidence of this effect is found in the numerical results even when *b* does not rise to consciousness; so it seems that *a* may in some way set the nervous tract concerned in the

production of *b* into a state of readiness, or subliminal excitement, that strengthens the association *a-b* without actually recalling *b* to consciousness. We must suppose that, in such a case when *a* is read in the syllable row—*a-c*—part of the energy of the excitement of the nervous tract corresponding to *a*, which, if *a* were an altogether new syllable, would be devoted to establishing an open road from tract *a* to tract *c*, is diverted to and used up in the re-excitement of the tract *b* or, at least, in the excitement of the tissue joining tract *a* to tract *b*. The 'associative Mit-erregung' obviously tends to obscure the working of the 'effektuelle Hemmung,' but as the conditions of their effectiveness are affected differently by the time-intervals between the establishment of the associations and the reproduction experiments, it was possible to separate the two factors by suitable variations of the experimental constellations.

Another interesting effect is the 'associative Misch-erregung,' the concurrence of two syllables to form a third, each supplying a part of it. This might be effected in two ways, either by a struggle between two syllables *b* and *c* that are both strongly associated with the arousing syllable *a*, *i.e.*, by a struggle between two strong reproduction-tendencies exerted by *a*, analogous to the struggle between the two dissimilar visual fields; or through one reproduction-tendency, in itself incapable of reproducing the complete syllable, being supplemented by a still feebler reproduction-tendency. The authors conclude that the latter is the usual form of the mixed reproduction, basing this opinion on various grounds, but chiefly on the observation that these mixed syllables are usually given by an intentional association and a 'Neben-association' rather than by two intentional associations, *i.e.*, by a strong and a weak association rather than by two equally strong associations.

The authors point out that some of their results can only be explained by the hypothesis that every memory-image that has any tendency to rise to consciousness, whether through its own 'Perseverations-tendenz' or through association, hinders to some extent the formation and the effectiveness when formed of new associations. Both Ebbinghaus and Müller and Schumann had shown that with increase of the length of the syllable-row the number of readings necessary to the learning of it increases very rapidly; a similar effect appears with the procedure by hits, and the authors conclude that in this case it can only be due to mutual inhibitory effects of the numerous reproduction-tendencies. The thought suggests itself that the effect may be due in part to that limitation of the capacity for attention invoked by Müller and Schumann to explain the fact that concentration of attention on one part of a syllable-row necessarily results in a diminution of the attention given to the remaining parts.

Chapter v. establishes the 'rückwirkende Hemmung,' a weakening effect exerted on recently formed associations by intellectual

application (in the cases dealt with, the learning of new syllable rows and the close examination and description of a landscape picture for a few minutes immediately after reading the syllable-row). The authors conclude that after the reading of a syllable-row a certain physiological activity persists for some minutes in the nervous tracts concerned, and that this, which is the basis of the 'Perseverations-tendenz,' increases the fixity of the associations between the syllables and is inhibited by any further mental work. This view is borne out by the fact that the 'Perseverations-tendenz' and the 'rückwirkende Hemmung' both decline very rapidly in the first few minutes, so that after ten minutes they are usually hardly appreciable. This demonstration of the 'rückwirkende Hemmung' throws light upon, we might almost say explains, certain recorded cases in which a severe blow on the head has wiped out completely the memory of immediately preceding events. It throws light too on the fact, noted by some persons, that what is learnt immediately before falling asleep is often remembered with exceptional accuracy.

Chapter vi. establishes the tendency of the last member of a complex to reproduce the first rather than intermediate elements, and the bearing of this upon verse is pointed out.

Chapter vii. investigates critically the false syllables spoken and establishes among other interesting results the following: each unaccented syllable tends strongly to reproduce its accented predecessor; each syllable tends to reproduce the next but one with considerable strength, and this is true in a greater degree of the accented than of the unaccented syllables; no evidence of mediate association could be found, but the conditions were not favourable to its appearance. The last chapter shows, among other things, how the type of memory of the subject may be inferred from the experimental results, and how this is not constantly visual, auditory or kinæsthetic in any one subject but may be mixed and may vary from time to time in a subject during the course of experiments. It shows also how different letters are not equally easily retained and treats of other peculiarities of the material and the subjects of the experiments.

This so fragmentary attempt to summarise the volume can give neither an adequate impression of its manifold interest nor an insight into the truly admirable thoroughness and ingenuity of the methods employed. But enough has been said to show that the investigations throw a flood of new light upon the physiological processes that underlie our higher mental processes, and that they suggest at once new problems and possibilities of solving them. It could be wished that the authors had taken this opportunity to discuss more intimately the physiological nature of those effects which are the basis of memory and association and the processes underlying hindrance ('Hemmung') and psychical inhibition in general, in the light of the new evidence obtained. For there can be no one more eminently qualified for

this task than Prof. Müller. But when so much has been given it is ungracious to ask for more. . With the earlier paper by Müller and Schumann, this work seems to the present reviewer to be a triumphant demonstration of the value of the application of experimental methods to the investigation of our higher mental processes, and it is undoubtedly a model of close reasoning and ingenious, accurate and bold experiment.

W. McDougall.

Animal Behaviour. By C. Lloyd Morgan, F.R.S. London: Edward Arnold, 1900.

Originally intended as a revision of *Animal Life and Intelligence*, this work grew under the author's hands into a new book. Hence the title, *Animal Behaviour*, which, already employed by Prof. Whitman in the *Biological Lectures* of 1899, is happily free from any implications of the presence or absence of consciousness as a factor at any given stage of animal life, and might well take the place of more equivocal terms commonly in use. The aim of the work, nowhere definitely stated, one may infer to be threefold: to characterise the chief types of animal behaviour or reactions to surrounding conditions, to offer a criterion for the presence of effective or guiding consciousness behind any particular mode of behaviour, and finally to discuss the limits of conscious evolution in the animal world below man: incidentally also the inheritance of acquired characters, and the relation of organic to natural selection are topics occupying a considerable space.

More than any other English writer Mr. Lloyd Morgan possesses the qualifications which Groos demands in the animal psychologist—uniting "with a thorough training in physiology, psychology, and biology the experience of a traveller," etc., and lately he has shown himself to be the *sine quâ non*, "a student of æsthetics". A lover of animals, he has the rare virtue of self-restraint in describing their mental attainments.

As is well known, Mr. Morgan has finally taken up a sceptical attitude in reference to the inheritance of acquired characters, and this work may be regarded as a successful attempt to describe and account for the evolution of animal behaviour without its aid. Inherited are (*a*) "those relatively definite modes of behaviour which fit the animal to deal at once, on their first occurrence, with certain essential or frequently recurring conditions in the environment," and (*b*) "the power of dealing with special circumstances as they arise in the course of a varied life". Acquired on the other hand are the modifications due to the individual's efforts to adapt itself to the environment in which it is placed. Instead of the inheritance of modifications we have the selection

of "coincident" variations, the survival of which is favoured by the modifications that coincide in direction (p. 40 ff.). The weak point in the theory seems to lie in the second inherited factor, the "innate plasticity," the "legacy which may be drawn upon for any purpose as occasion may demand" (p. 41), "the reserve fund of intelligent accommodation," "inherited ability to meet specially difficult circumstances as they arise" (p. 176). It is difficult to understand how an indefinite faculty of this kind can be inherited, or how to picture to ourselves the structural basis. Mr. Morgan himself supplies the corrective—"Individual behaviour in its first intent, is a biological legacy with ends predetermined through heredity. . . . But the attainment of ends thus already predetermined has feeling-tone, both as process and in its resulting consciousness, and this feeling-tone serves to modify, through the situation it introduces, future behaviour." "Pleasure is not for them (animals) a motive of conduct, though nice objects, as such, are attractive, and through them impulse acquires direction and force" (pp. 283-284). Inherited then is the attraction by nice objects, and repulsion by the reverse, what objects shall be nice being also congenitally determined, but the associations (*e.g.*) between the taste and the sight of objects have in all cases to be acquired. Readiness in forming associations, firmness in retaining them, promptness in acting upon them—all these are subjects of organic variation, on which natural selection may play, and for which on the other hand a structural basis can easily be imagined. Perhaps this is only a restatement of Mr. Morgan's own view, but certainly the idea of an innate plasticity is left vague: it is applied for example to lower organic forms, where no learning by experience is admitted, and where it seems to mean variation simply.

Without committing himself to a definite statement, Mr. Morgan suggests that Consciousness as we know it—"Consentience"—may have been preceded by a stage which he names "sentience" or non-effective consciousness. "*Ex nihilo nihil fit*, and since consciousness must, on this principle, be developed from something, it is reasonable to assume that this something is pre-existing sentience" (p. 61). Sentience is consciousness that merely accompanies reactions, but does not control or guide them: it is passive, momentary, discontinuous, as compared with the active continuous consciousness that may have been developed from it (Michael Foster). Admittedly hypothetical, its presence cannot be ascertained by any known means, but, if it exists, it probably represents the kind of conscious life enjoyed by plants and by the lowest animal forms,—protozoa. The consciousness which occurs is merely a "dim sentience," and has no directive influence on the nature of the organic response called forth. It also, if any, is the consciousness present in correlation with the reflexes of the higher animals during the early stages of growth. Just how ineffective passes into effective consciousness is hardly clear: in one passage (p. 295) it is said that in the former "the process

of conscious coalescence has not begun or has not been carried far enough". Elsewhere the guiding consciousness is said to arise in connexion with certain centres of control in the nervous system, to stand apart from what it guides as these centres do from the lower centres of direct action (pp. 43, 331). The consciousness that leads to guidance of action arises from the results of *previous* behaviour: but again consciousness is correlated never with efferent but always with afferent impulses or their representations (p. 45). After all then is the difference between Sentience and Consentience more than one between simple and complex, and if so, can a difference of complexity cause a difference so wide as that between merely accompanying and controlling consciousness? "Mere sentience, if it exists, has no power of guidance over organic behaviour, but consciousness, when it emerges, is a concomitant of nervous processes which determine the nature and direction of such nerve changes as are antecedents of intelligent behaviour" (p. 331). But sentience is also the accompaniment of a nerve process, and nerve process cannot, we may assume, occur without determining behaviour: the only difference in the case of sentience is that the nerve process does not produce behaviour directly, but through the medium of other nerve processes, *i.e.*, the whole central process is more complex. It seems, therefore, that only two alternatives are open, either to take all consciousness, including sentience, as alike effective (or ineffective) in determining behaviour, or to suppose that consciousness only begins with types of behaviour that show adaptation on the ground of experience: the experience itself producing the adaptation, through association, and being therefore an effective consciousness. The latter appears the more satisfactory hypothesis; it is difficult to understand the *ex nihilo nihil fit* argument (p. 61), for it holds of sentience as well as of consentience, and a consistent monist must follow Haeckel in supposing a form of consciousness (?) to accompany the movement of the atom. Metaphysics apart, there is no serious objection to postulating two seemingly abrupt transitions in nature, since we must in any case postulate one. The problem would then arise,—at what point in the evolution of organisms does consciousness first appear?—the problem which Bethe, *e.g.*, touches in trying to reduce the behaviour of ants and bees to the reflex type—*i.e.*, to a stage prior to the appearance of any conscious process.

One of the most valuable contributions of this work to animal psychology is its view of the relation of instinct and intelligence in the individual mental development. Experience is not inherited, but only the conditions under which experience may be acquired, *viz.*, the instinctive reactions to stereotyped surroundings. For example, fear of any particular animal, such as man, is never innate, but timidity, the tendency to run, hide or crouch, is so, and forms the basis on which particular fears are built up (p. 48). In instinct itself what is inherited is not knowledge of any kind

but simply a muscular co-ordination, set up by a certain stimulus: on seeing a worm the young bird pecks at it not because it knows what pecking means, or its use, the action is unconscious, at the same time it derives sensations, both from the act and from its result, by which its future behaviour may be modified. Only the first exercise of an instinctive act is independent of experience (p. 105): there is thus a continual interaction between instinct and intelligence, in spite of their difference of origin: but the more fixed the former, by inheritance or habit, the less capable is it of intelligent modification (p. 171). Far from finding the world a sensation-chaos from which it has to select the data for its experience, under the guidance of chance, the young consciousness enters into what is already a "going concern". There is a "thrusting forward of certain modes of behaviour by the conditions of organic life" (p. 53), these are impressed on the animal's consciousness and constitute its first centres of interest. The conscious situation, the meaning of objects develops under experience, and the responses become correspondingly more complex. "Experience grows by the coalescence of successive increments, and each increment modifies the situation which takes effect on the *succeeding* phases of behaviour" (pp. 46, 47).

A distinction which occupies a foremost place in *Animal Behaviour*, and for which, as well as against which, much might be said, is that between intelligent and rational action. "We shall reserve the term *rational* for the conduct which is guided in accordance with an ideal scheme or deliberate plan of action, while for behaviour, to the guidance of which no such reflexion and deliberation seems to have contributed, we shall reserve the term *intelligent*" (p. 59). The stages of consciousness to which the types of action correspond are practically the perceptual and ideational of Dr. Stout. In the one type we have behaviour arising from impulse, in the other conduct arising from motives. In an intelligent being impressions are linked together by bonds of association, combining and coalescing to constitute a conscious situation (which has "meaning" for the animal), effective under the guiding influence of pleasure and pain—at its highest mere picture thinking, in which the outline, the emphasis, the colouring, and the succession of the pictures are due to the passive impress of experience. The seemingly rational actions of animals are almost invariably, as Mr. Morgan holds, products of this form of consciousness, the "trial and error" type. He does not accept the suggestion of Thorndike that the actions even of higher animals are accompanied by no representative images of past experience, that association is between percept and impulse to act, not between ideas or ideal elements. Mr. Morgan gives also rather scant consideration to Bethe's work, to which reference has been made. But certainly the Peckhams' locality-studies on the solitary wasps seem to settle the question in favour of "intelligence" as against "reflex" behaviour. In contrast with the merely intelli-

gent, the rational being thinks by way of general or abstract rules rather than by concrete examples. Those who have read Mr. Morgan's other works will remember that the difference between the lower and the higher consciousness is made to depend on the way in which the forms of connexion, the relational elements within the pictures are brought into the focus of attention. The generic images of the intelligent mind are the "embryonic structures from which, under the quickening influence of a rational purpose, abstract and general ideas may be evolved" (p. 166). Only one is apt to feel that here, in the rational purpose, "the intentional purpose directed to the special end of isolating the one" (abstract ideas) and "classifying the other" (general ideas) is a difference in *kind* introduced. How can a being which starts from the level of picture thinking conceive the purpose of isolating an idea? On the other hand, if there is no difference in kind, there can be no hard and fast line drawn in the animal world between rationals and non-rationals, and indeed Mr. Morgan admits in many animals an approximation to reason—in the cat, for example, which punishes it kitten for uncleanliness.

Having established the three phases of conscious behaviour—instinctive, intelligent, rational—the author proceeds to show how in all the more general modes of reaction to environment these phases reappear. Play, imitation, tradition, communication, all these are at first instinctive, are pursued, secondly, on account of the pleasure experience shows to be derived from them, finally are chosen as means to ulterior ends. The imitation of each other by chicks, for example, is imitation "in its effects, not in its purpose," while the imitation which Thorndike denies of animals is precisely of the rational or reflective type, involving the perception of relations otherwise quite outside the animal's experience. In interpreting those actions of animals which suggest the higher ethical qualities of sympathy, sense of justice, and the like, Mr. Morgan is extremely judicious; he traces the former to the projection of the shadow of feelings, of which the animal itself is conscious, into others, and the latter to its antipathy to any breach of routine—a marked character not only of the animal but also of the child and the savage.

When so much is being written attributing impossible qualities to the animal mind, it is refreshing to meet with a work so free from bias, at once careful in its observations and unimpeachable in its psychology, especially when there is added the clearness of style and freshness and charm of illustration which mark this as well as Mr. Morgan's earlier works.

J. L. McIntyre.

Kunstwissenschaftliche Studien. Von Ernst Grosse. Tübingen: Freiburg, i. B., und Leipzig, 1900. Pp. 259.

These chapters are intended as Prolegomena to a series of more special studies which are to follow them. The problem of the Science of Art (*Kunstwissenschaft*) is the understanding (*Erkenntniss*) of the phenomena which are comprehended under the name of Art, of their nature, causes and effects. The author's view seems to be determined by three main contrasts to the history and philosophy of art as hitherto represented. The art work of the lower peoples has been inadequately investigated; the direct evidence of the artist's inner life has been neglected; and the definitions of particular arts have been conjured out of an assumed idea of art in general, whereas the notion of "art" should be abstracted from a study of "the arts". On this latter point it may be observed that he admits the order of exposition to differ from the order of inquiry, and himself takes advantage of this reservation so far as to follow his introductory chapter immediately by an exposition of the essential nature of Art (*Wesen der Kunst*). Perhaps the philosopher might claim a similar privilege on similar grounds. None the less the author is convinced that the regular building of science has yet to be erected "on the ground now cumbered with the tents and booths of questionable philosophical theories". I may say at once, so as not to recur to the subject, that I do not think he realises how much experience and insight have gone to the making of the theories which he disparages: nor how entirely his own endeavour towards a science of art falls within the outlines which were drawn a century or even two score of centuries ago. His strong point is plainly the study of Chinese and Japanese art, together with that of the lower peoples. Here is, unquestionably, an opening for valuable research, which may add new life to the general theory of art by bringing it into connexion with anthropology, and may throw a completely new light on multitudes of its details.

For the Essence of Art, then, the author follows Schiller's play theory, and finds the fundamental attribute in Freedom, alike for artist and spectator. In separating the enjoyment of the spectator sharply from the enjoyment of the artist he seems to neglect such obvious experiences as those of reading poetry, singing, dancing, performing music, together with the general conditions of sympathy and intelligence in appreciating beauty. Of course the spectator does not in thought repaint the picture which he looks at; but if, as I think the author would maintain, he looks at the scene represented through the artist's eyes, he surely in his degree must have done the brain work and felt the mood which the artist has felt and done. On the other hand, I welcome the author's outspoken criticism of the extreme doctrine of *Einfühlung*. If it means, he says, that what we feel we feel in and through ourselves, it is surely not new. If it means that the

perception of a form at rest must be translated into feelings of movement before we can enjoy it æsthetically, it can hardly be universally true. It appears to be Idealism (I shall add to the author's remark) of a partial and arbitrary kind.

It seems to me a pity that in working out the play theory he denies the quality of Æsthetic "*Schein*" to Music, Architecture, and the Decorative Arts, on the ground that they are not representative. Music, surely, as Plato and Aristotle agreed, is the strongest, though the purest æsthetic semblance, plucking out the very heart of things. And architecture and decoration are arts only in as far as they have a "show" distinct from their utility.

The following chapter, on the Essential Nature of the artist (*Wesen des Künstlers*) presses the conception of the unconscious creativeness of genius, as opposed to the deliberate constructiveness of talent, to what seems an undue pitch; and hence the writer shows great reserve in treating the work of art as the self-revelation of the artist. I am inclined to complain that the facts and ideas on which these conclusions depend are treated with too little reference to ordinary human nature, in which they would all be found to centre without the sharp separation which they present on the surface. Creative genius is unconscious and involuntary in its operation. So is the process which brings back a name I have forgotten; it will come back when it chooses, and nothing I can do will fetch it. A genuine artist is transformed when he is at work; so is my awkward and indolent friend the moment he mounts a horse. All this is really nothing against the unity of the artist's personal, ethical, and æsthetic character, though it is, of course, true that a great intelligence which has given itself wholly to formative art may hardly retain power to express itself in any other way. The same effect may be produced by science or politics. I am incredulous, however, as to instances in which it is alleged that a really great artist has no greatness at all in the rest of his personality. It was not true of Turner. I admit that I have not the knowledge to deal with the case of Benvenuto Cellini.

Art and Race is the subject of the next chapter. The difficulties of studying either the same race under different conditions or different races under the same conditions are elaborately brought out. The author explains clearly the difference between a true race, whose characters are practically permanent, and a people, whose character depends on a common culture. But as the most important art belongs to "peoples" of highly mixed race, and as many conditions interfere with the pure expression of racial qualities even in the less mixed populations of the world, there appears to be little that can really be identified as racial in art, with our present knowledge, though the author hopes that more elaborate studies and comparisons may remove the difficulty. It may be doubtful whether the lesson of the inquiry will not prove to be that the "people" will have to be taken as a unit, at once

as a "breed," however mixed in origin, and as a type of culture, and the attempt to disentangle pure racial character in art abandoned, except for such very general features as distinguish, *e.g.*, the Negro stock from the Mongolian. The author has paid much attention to instances in which the reputed art of a country is really produced by resident aliens, which tend to complicate the question still further. Thus the famous Satsuma ware of Japan is really, it seems, the work of an imported settlement of Koreans, who did not intermarry with Japanese, and the Athenian potters were in many cases foreigners. In ascribing with the author the decadence of Greek civilisation in the fourth century B.C. to a mixture of foreign blood, there is some risk of the disaster of assigning an adequate and real cause for an effect which does not exist. Few ideas are changing so rapidly to-day as our views of decadence. The chapter closes a critical discussion of considerable value with the remark that the confession of ignorance is the beginning of knowledge.

The effects (*Wirkungen*) of pictorial art come next. The earlier part of the chapter, which deals with the monumental uses of early plastic and painting, reminds us to some extent of Dr. Hirn's treatment of the origin of art in practical needs. The religious importance of the portrayal of deities is also discussed, with a recognition of it as meeting a popular need, to a degree which we should probably not find applicable to the English mind —an interesting question. And the effects of a people's pictorial art on its perceptive powers and habits are very suggestively traced. A discussion of the peculiar felicity with which the Japanese artists represent, and the people perceive, motion as opposed to form, seems to indicate a line in which the author might be of great service to æsthetic science, by turning his unusual knowledge of Chinese and Japanese art to account, in a complete and workmanlike study of its æsthetic peculiarities. In the same way, in the last chapter of the book, on the effect of Science on Art, we are confronted with the views of Japanese artists and critics on the want of unity which Naturalism produces in Western pictures. A poem (*Dichtung*) in colour or form, is what the Japanese thinks a picture should be, and our desire for correctness of detail strikes him merely as a prejudice, the source of æsthetic vices. The view, however, that Science is the cause of our Naturalism seems not quite adequate, though it points to a truth. The love of the spirit of Nature, which underlies both organic Science and Naturalistic art, goes back to the eighteenth century sentimentality and Thompson's "Seasons," and even, in a sense, to the early days of Christianity. Wordsworthian or Rousseauite Nature worship has little to do directly with science, though they have a common root.

On the whole, the book has disappointed me a little, though I have learned very much from it. Schopenhauer is the writer's chief philosophical authority. I see no trace in him of Kant or

Hegel. His illustrations of European art are not such as Englishmen can readily follow. Böcklin, Gotthelf, Keller are names frequently mentioned with the very highest praise. I do not doubt their excellence; but I feel a slight one-sidedness in the way in which they are put forward. The promised special studies will probably be more valuable than the present Prolegomena.

BERNARD BOSANQUET.

Die körperlichen Aeusserungen psychischer Zustände. Von A. LEHMANN. Leipzig: O. L. Reisland, 1899. Pp. viii., 218.

THE record of experimental work on the organic changes accompanying emotional and other psychical states has been very disappointing. The earlier investigators obtained definite results, which seemed to show that each emotion has its characteristic physiological accompaniments, and it was on the basis of such work that the view was advanced that the organic changes were not merely the expression of the emotion but were the essential factors in the production of the emotional condition.

As time went on, the organic changes accompanying emotional conditions were found to be less and less distinctive, until the latest workers have failed to find any essential difference in the organic accompaniments of such opposed states as pleasure and pain.

The present work of Lehmann, which deals mainly with plethysmographic observations, gives the whole subject a fresh starting-point. He makes a hopeful beginning by finding difficulties in the subject of which previous workers have shown little appreciation. He finds that the characteristic accompaniments of a given mental state may be obscured, or even completely neutralised, by those of some other mental state existing with it. Thus the characteristic effect of painful sense stimulation may be obscured or neutralised by a co-existing condition of expectation (*Spannung*). According to Lehmann, pain is accompanied by marked diminution in the volume of the arm, together with certain changes in pulse and respiration. Expectation, on the other hand, is accompanied by an increase in the volume of the arm, and if both states exist together, the change in the volume of the arm, which is one of the characteristic features of each state, may be entirely absent. Similarly, the characteristic accompaniment of pleasure may be obscured or neutralised if there is a co-existing condition of concentrated attention; the less concentrated the attention, the more marked are the changes characteristic of pleasure.

Every one who has awaited the occurrence of a psychological experience under experimental conditions must have met with the difficulty of remaining in a receptive frame of mind. One

tends to follow out some train of thought on the one hand or to pass into a vague, absent-minded condition on the other. Lehmann finds that each of these states shows its influence clearly in the plethysmographic tracing, and each may obscure the record of the state which it is desired to investigate.

If these facts are true, and there is little reason to doubt them, they go far towards explaining the unsatisfactory results of previous work. When taken into account, Lehmann finds that every mental state has its characteristic physiological accompaniments, consisting not only in a given association of organic changes, but also in a given sequence of such changes. Like earlier workers, and in accordance with his own earlier work, he finds that pleasure and pain are accompanied by organic changes of an opposite kind. With painful sense stimulation there occurs, according to Lehmann, marked sinking of the volume curve, which continues for some time, and is associated with diminution of both height and length of the pulse. With pleasurable sense stimulation, on the other hand, there is, after a slight initial fall, a rise of the volume curve above its normal level, while the pulse beats are increased both in height and length.

In the experimental production of the states of pleasure and pain, Lehmann has used sense stimulation, and the objection might well be raised that we have no means of telling how far the changes produced are physiological effects due directly to the sense stimulation, and how far they are the results of the state of feeling produced by the stimulation. Lehmann answers this objection by further interesting observations. He finds that in nitrous oxide anæsthesia, the organic changes do not occur and that in partial anæthesia the organic changes are proportional to the amount of pain experienced. He also finds that in hypnosis, suggested conditions of pleasure and pain are accompanied by exactly the same changes as those which occur when the conditions are produced by sense stimulation.

The part of Lehmann's work which seems most open to objection is concerned with his methods of producing the mental states to be investigated. For conditions of pain, he has used chiefly unpleasant tests, such as those of acids and quinine, and cold applied to the skin. He has not employed pressure on the skin, although such an instrument as Cattell's algometer would give him a simple means of producing painful sense stimulation which can be readily graduated to any intensity. More decided objection may be raised to Lehmann's method of studying attention. As means of producing this state, he used arithmetical calculations, learning series of nonsense syllables by heart and counting groups of irregularly distributed dots. Among other changes he finds irregularity of the respiration to accompany these operations, and regards this as one of the characteristic organic accompaniments of attention. It seems unlikely that concentrated attention should be associated with irregularity of bodily processes, and I cannot help sus-

pecting that the irregularity has its source in the movements, especially of the head and eyes, which would occur in Lehmann's methods, and especially in counting irregularly distributed dots. Some observations which I made some time ago are in favour of this supposition. I was engaged in studying the periodical variations of after-images and recorded my respiration while observing the after-image, with the object of finding if there was any agreement in the periodicity of the two processes. In this work I concentrated my attention, first on a given visual stimulus, and secondly on a fixation point while I awaited the series of after-images. It seems to me that my mental state was much more nearly one of pure attention than in any of the methods employed by Lehmann, and my respiration was extremely regular. I am inclined to ascribe the differences between Lehmann's result and my own to the presence, in the one case, and absence in the other, of movements of the head and eyes.

Lehmann's researches have great importance in connexion with the theory of emotion associated with the names of James and Lange. This theory had its original starting-point in the experimental results of Lange. When investigators found that different emotional conditions were accompanied by the same organic changes, the theory seemed to have lost its experimental basis. Lehmann's results, if accepted, restore to each emotion its characteristic organic changes, but no longer in a form to support James and Lange, for Lehmann finds that what is characteristic of an emotion is not merely a given association of organic changes but a given sequence of such changes, and, if the organic changes were the source of the emotion, the latter would not attain its characteristic features till the sequence had run its course. Further, as already mentioned, Lehmann has found that the organic changes which appear to be characteristic of an emotion or state of feeling may not occur, owing to the co-existence of another condition, and yet the emotion or state of feeling may be indistinguishable from that accompanied by the normal vascular changes. That the characteristic changes should occur with an emotion or state of feeling suggested in the hypnotic condition, must also be regarded as not easily reconcilable with James's view, and, indeed, the mere fact that it is possible to suggest an emotion or state of feeling constitutes a difficulty for the theory.

It is to be hoped that other psychologists, alive to the complexities of the subject, will put to the test and confirm Lehmann's results,[1] for his work gives new vitality to a branch of experimental psychology which seemed to show very faint prospect of bearing fruit.

W. H. R. Rivers.

[1] Unfortunately I have not had the opportunity of studying Lehmann's curves, and my account is based on the description of the curves given in the text.

Kant's Cosmogony: As in His Essay on the Retardation of the Earth, and in His Natural History and Theory of the Heavens: With Introduction, Appendices, and a Portrait of Thomas Wright of Durham. Edited and translated by W. HASTIE, D.D., Professor of Divinity, University of Glasgow. Glasgow: James Maclehose & Sons, 1900. Pp. cix., 205.

PROF. HASTIE has accomplished, in the present work, a task which will be extremely useful to all who are interested either in Kant's early views or in the origins of modern speculations as to the development of the Solar System. In addition to the translations of Kant's two works, *Whether the Earth Has Undergone an Alteration of Its Axial Rotation* (1754), and the *Universal Natural History and Theory of the Heavens*[1] (1755), there is a very full Introduction, giving the main points of historical importance as regards the origin, influence and tenability of Kant's Cosmogony; and there are three Appendices: (A) "Dieterich's Summary of Kant's Theory (1876)"; (B) "The Hamburg Account of the Theory of Thomas Wright of Durham (1751)"; (C) "De Morgan's Account of Wright's Speculations (1848)". The Appendix B is especially interesting from a historical point of view. Kant tells us (p. 30) that his Cosmogony was suggested by the account in the Hamburg *Freie Urtheile und Nachrichten* of Thomas Wright's *Original Theory or New Hypothesis of the Universe.* It does not appear that Kant was acquainted with the original work, so that the Hamburg account becomes important in judging what Kant obtained from Wright. Unfortunately, Prof. Hastie has not seen the original, but has made his reprint from a MS. copy, the correctness of which may be open to question. Though Mr. Wright appears to have indulged in some very fanciful hypotheses, it appears clearly that he was the source of a considerable part of Kant's theory. "One motive of this work," Prof. Hastie says, "has been to do justice to Thomas Wright while furnishing the means for determining exactly what Kant owed to him" (p. lxviii.); and this has been successfully accomplished in the present work. The translation, though it contains many small inaccuracies, is, so far as I have verified it, free from serious errors.

As regards the intrinsic value of the works translated, very different opinions have been held. The first, on the retardation of the earth's rotation, is extremely short (nine pages in the translation), but genuinely scientific. It points out that tidal friction is a constant cause of retardation, and that this cause, though small, is cumulative, and therefore not to be neglected. It also suggests that tides give the explanation of the fact that the moon always turns the same side to the earth (p. 10). Although its

[1] The concluding portion of this work has not been published in the translation, partly because Kant himself, in 1791, would not permit its republication, partly because what has been published is complete in itself. The part omitted has, in my opinion, no very great value.

numerical data and results are extremely far from the truth, the main conclusion is indisputable, and appears to have been first discovered by Kant (see p. xliii.).

The larger work, on the *Natural History and Theory of the Heavens*, is more speculative, being concerned with a possible origin, not only of the Solar System, but of the stars generally. Prof. Hastie thinks that this theory "will probably be regarded hereafter as the most wonderful and enduring product of his (Kant's) genius" (p. ix.). On the other hand Dühring [1] will allow no merit whatever to Kant's speculations, except that he sometimes, by accident, reaches a correct result by fallacious reasoning from false premisses. Although Dühring, no doubt, goes somewhat too far, his judgment would seem, from a scientific standpoint, to be nearer the truth than that of Prof. Hastie. Kant's premisses are usually false, and his reasoning is usually fallacious. But his theories have a value as a stimulus to the scientific imagination, and in parts they have a literary value in the almost Miltonic descriptions of "the realm of Chaos and old Night". This is especially the case in part ii., chapter vii., "Of the Creation in the whole extent of its infinitude, both in Space and in Time". The Solar System, we are told, forms part of a larger system, which is the Milky Way; the Nebulæ are in reality other Milky Ways; [2] many Milky Ways combine into a new system, and so on. To this process of forming larger and larger systems there is absolutely no end. Each system is gradually developed out of the original chaos, and different systems are developed at different times. But all perish, and return to the original chaos again. The process is then repeated, and so on *ad infinitum*. Thus the antithesis in the first antinomy represents a real stage in Kant's thought.

Kant, like Boscovich, assumes two forces, attraction and repulsion, of which the latter is insensible except at small distances. The original chaos is of different densities in different parts, and the denser parts gradually become nuclei of the heavenly bodies. The universe is originally cold, and stars only become hot in the process of contraction. The sun is supposed to be actually in a state of combustion (p. 159). The theory of the formation of planets and satellites, and of Saturn's ring, is worked out in some detail; but the arguments are always vague, and seem not infrequently to be definitely mistaken. Kant seems at times to suppose that the resultant attraction of a system on one of its particles must be directed to the centre of mass of the system. He bases an elaborate argument upon the fact that, on the whole, the eccentricities of the orbits of the planets increase with their distances from the sun. This leads him (part ii., chapter iii.) to the suggestion that, in accordance with Leibniz's

[1] *Principien der Mechanik*, third edition, pp. 390-391.

[2] It was, of course, not known in Kant's day that some nebulæ are not composed of stars.

law of continuity, there are probably planets beyond Saturn, with more and more eccentric orbits, and gradually approximating to comets. But we know that, when such planets were discovered, they were found not to approximate to comets at all. This is a fair sample of the kind of reasoning employed.

On the whole, Kant's theory is hardly to be ranked as a scientific hypothesis, not because, in its general outline, it is improbable, but because Kant wholly failed to show that it is probable. It is rather to be classed with ancient cosmogonies, among which Kant himself mentions, as similar to his, those of Lucretius, Epicurus, Leucippus and Democritus. The work is interesting because Kant wrote it, and because, in incidental remarks, it shows him as a thorough Leibnizian.[1] But the value of a work in which a bold hypothesis is put forward lies in the arguments adduced in support of the hypothesis, not in the fact that others afterwards find arguments to support it or something similar. Science, unlike theology, is concerned, not with the *enunciation* of "great truths," but with their demonstration.

B. RUSSELL.

[1] See, *e.g.*, the dictum on inertia and resistance as limiting freedom, p. 166.

VI.—NEW BOOKS.

The Neo-Platonists: A Study in the History of Hellenism. By Thomas Whittaker. Cambridge, 1901. Pp. xiv., 231.

Since the great revival of speculative studies in the nineteenth century Neo-Platonism has been less written about and has attracted less attention in England than any other school of ancient philosophy, with the possible exception of the Sceptics. Several copious and admirable histories of that great movement have appeared in France and Germany; but none of them, so far as I am aware, have been translated into English. Within recent years, however, increased attention has been drawn to Plotinus; and the high admiration expressed for him by Prof. Gilbert Murray must have excited the curiosity of many. The moment then was opportune for the publication of a monograph on the Neo-Platonists; and Mr. Whittaker has given us not merely the best that has appeared in this country—which would be saying little—but one in all respects as good as could be made of its size. Besides a careful study of the original texts he has gone over the best modern literature of the subject; his materials are judiciously employed; and the results of much reading, aided by much reflexion, are conveyed in a clear and temperate style. More than a third of the volume is given to Plotinus—no excessive share, considering his immense preponderance over the rest of the school; a whole chapter, perhaps the most generally interesting in the book, deals with 'the Polemic against Christianity'; room is found for a very full summary of that little-read treatise, Proclus's *Elements of Theology;* and the whole concludes with a view, certainly not deficient in breadth or daring, of the absolute value of the philosophy analysed in the preceding chapters.

To all historians of Neo-Platonism the question of its origin has been one of primary importance. Was it a continuation of the pure Greek tradition, or a mere Hellenic version of Oriental theosophy making its way through the open door of Alexandria into the Western world? The second title of Mr. Whittaker's book at once indicates his position in the controversy. He stands frankly for that philo-Hellenic interpretation which has been more and more prevalent among his immediate predecessors in the field. Not only did Plotinus and his successors place themselves in line with the 'blessed ancients,' the Greek thinkers of the classical period, but they also waged war on behalf of Greek rationalism against the Oriental phantasies which were rapidly submerging Western civilisation; and it was as a part of this conflict that Porphyry and Julian struck at Christianity itself. Here Mr. Whittaker does not conceal the extent of his sympathy with what was then, but was not in after ages to be the losing side. 'The Græco-Roman world had a perception, vague at first, but gradually becoming clearer, of what was to be meant by Christian theocracy' (p. 140). And this perception translated itself into a resistance which was no mere struggle of effete super-

stition against a higher and purer faith, but, with the leading minds at least, a protest of reason against authority, of liberty against intolerance, of science against supernaturalism, of philology against forgery.

No one who submits to the rather irksome task of reading the *Enneads* through can fail to convince himself that whatever Plotinus teaches is either the repetition or the development of what had been taught long before in the schools of Athens. Even his much decried mysticism has its roots in Plato's philosophy both as regards its superessential object —to the genesis of which by the way the One of the *Parmenides* contributed perhaps even more than the Good of the *Republic*—and, Mr. Whittaker would add, the theory of its apprehension. It seems to me, however, that the greatly superior rationality of Plato as compared with his late-born disciple deserves a recognition that it does not meet with here. Enthusiasm and ecstasy, according to him, are modes of apprehending truth distinctly inferior to the conviction brought about by dialectic; they do not, as with Plotinus, involve an identification of subject and object; and they are not mentioned in connexion with the supreme principle of the *Republic* and of the *Timæus*. Apart from its mystical ecstasy Neo-Platonism has been reproached with the addiction of some of its professors to magic and theurgy. But Plotinus is altogether free from this imputation; and as regards the rest of the school Mr. Whittaker has succeeded in reducing it to a minimum, more especially with reference to Iamblichus.

In his concluding chapter our author appears rather as the apostle than as the apologist of Neo-Platonism. Its thought, according to him, is 'the maturest that the European world has seen,' (p. 210). That is a startling claim, and the plea on which it rests seems to be singularly inadequate. Neo-Platonism, we are told, is 'the result of a continuous quest of truth about reality during a period of intellectual liberty that lasted a thousand years' (*ib.*). Even if we understand 'intellectual liberty' in the most superficial sense as immunity from material penalties for the profession of unpopular opinions, the phrase is open to grave exception in presence of the treatment that befel Anaxagoras, Diagoras, Protagoras, and Socrates at the hands of what Renan has well called 'the Athenian Inquisition'. But there are obstacles to the quest of truth more deadly than the fear of hemlock; and one cannot call a thought really free that worked under the general limitations of the Greek mind, under the special limitations imposed by the religious prejudices inherited from Athens, under the formal influence of Roman imperialism, and finally under the yoke of Plato and Aristotle. Mr. Whittaker speaks disparagingly of what modern thought has done as 'isolated efforts bounded by the national limitations of its philosophical schools' (*ib.*). But this is really an admission that it has worked under more varied conditions than ancient thought and with more immunity from a fixed tradition. No better guarantee for intellectual freedom could be conceived. Besides, as no one knows better than Mr. Whittaker, modern thinkers started with Neo-Platonism fully set out before them, and on examination they have rejected its teaching, not as unorthodox but as untrue, or rather as unreal. He has devoted some pages to the bearing of modern science—for which he seems to have more respect than for modern philosophy—on the systems of Plotinus and Proclus. By an argument more ingenious than convincing he interprets the henads of the latter into ideal types prefiguring the many stellar centres of planetary life which post-Copernican astronomy supposes to be distributed through space (pp. 214-215). But he omits to point out a centre of the universe representing the supreme henad as it was once represented by our sun. The theory has

lost more than it has gained—not that either loss or gain is worth discussing. We are more interested when Proclus says that 'in the order of genesis the imperfect comes before the perfect' (p. 213). The fact is sufficiently obvious; but the important thing to notice is that in our doctrine of evolution the 'order of genesis' has been extended to existences which Proclus held to be eternal. Finally Mr. Whittaker—I will not say admits but—presses the incompatibility between Neo-Platonism and the scientific theory of entropy, the doctrine that 'the universe is running down to a state of unalterable fixation' (p. 213). Whether the doctrine is or is not true we shall never know; but one thing we do know, which is that inexhaustible sources of physical energy, such as Plotinus supposed the sun to be, do not exist; and even if there were any such we know by the best of all possible tests, the test of inconceivability, that an abstract superessential unity, such as he placed at the summit of the universe, cannot be one of them. Even Hegel is better than that sort of thing. The vagaries of contemporary speculation are almost incalculable; but one may venture to prophesy that any individual embracing Neo-Platonism as a philosophic creed will be apt to find that his adhesion is, in the language of its founder, a flight of the alone to the alone.

ALFRED W. BENN.

Sanity of Mind. A Study of Its Conditions and of the Means to Its Development and Preservation. By DAVID F. LINCOLN, G. P. Putnam's Sons. Pp. 171.

In a scientific age it would seem that often *a priori* speculations on education lead to pessimism. We are invited, for instance, to agree that education can do nothing for the idiot and nothing for the man of genius —that educational influence only counts between those extremes, if it counts at all. Dr. Lincoln's theme is the extremely depressing one of mental derangement and degeneracy, but the whole tone and tendency of his book is optimistic. In the study of economics we have learned to look for light on, say, the doctrine of rent, through the consideration of land, in the first place, under "the least favourable conditions" to ensure cultivation at all. Dr. Lincoln's task appears to be, to thrust further back the point at which education can begin under "the least favourable conditions," if not to the zero of mental capacity, at any rate to a point which to the ordinary lay-reader seems to approach closely to it. Accordingly, Dr. Lincoln's method is nothing if it is not hopeful, not to say jubilantly optimistic. After reading the book, we think his optimism is well grounded, and we rejoice at its incoming.

It might, indeed, be that an absolute idiot or an absolute man of genius would be ineducable, but the fact, of course, is that these individuals are nonentities. Dr. Lincoln seems to think there are none who are quite completely equipped in physical soundness, nervous organisation and mental balance, and whose mental balance in every respect is above suspicion. But to make up for this indictment, Dr. Lincoln's book suggests the enormous possibilities that lie before the educator (taking the term in its broadest sense) provided that he is endowed with human sympathy and with adequate knowledge of the conditions under which he has to work. And, secondly, the teacher (who by much instructing has not yet lost the power of learning) will be led to observe that he may himself be the cause of depressed vitality of life and thought, of repressed higher forms of mental activity in his pupils, by his own inadequacy of thought and feeling in the points of contact between his own mental

activity and that of the pupils. If sanity is 'harmony with one's psychic environment,' it behoves the teacher to consider the large amount of 'environment,' which he personally forms in the world of the child. It behoves him to consider how differently constituted each individual is, and to consider what may be, or rather what are, the reactions which his ways and methods, and material of instruction, are causing in the mind of the child. All this is hidden from view by the fact that usually he gives his lessons as doses prescribed by an examination syllabus, and each dose is more or less methodically constituted, so that it can apparently as far as size is concerned be swallowed equally readily by all. The heading to chapter iv. is from Wilhelm Meister: "Alas! how much there is in education, in our social institutions to prepare us and our children for insanity". This is a hard saying, but the chapter is worth reading patiently by teachers.

Dr. Lincoln quotes from Clouston: "Child mathematicians, child musicians, and child poets, are rare, and we know they are all more or less pathological. I think that development of any faculty or power in a boy or girl, in a lad or maiden under twenty-five that is premature in time, or that is clearly out of proportion to other faculties and powers, should be carefully watched and looked on with much medical suspicion." This, be it noted, is the latest word of medical science, in an age of specialism, and one fears, it must be added, of a tendency to *early* specialisation.

Dr. Lincoln has strong views with regard to our social and civic duties to the insane and imbecile. The question of statutory regulation of marriage of defectives introduces the idea of "limits," which seems to be in danger of being arbitrary, not to say tyrannical, against the rights of the individual. Yet the burden to the community of morbid inheritance is so great that the whole question must come into the range of social and civic duties. But it is clear, and this is Dr. Lincoln's view, that public opinion must be formed before legislation can be effectively brought to bear.

Dr. Lincoln's book brings us back to the delicate and intricate work of the educator. The education of a child is, as it were, held in commission by the parent, the teacher, the medical man, and by others. These factors must, if education is to reach its best usefulness in their various combinations, find a common denominator. The fact is that the study of the child is most complex. At present the teacher is not equipped with the matter of the sciences underlying his work. He thinks his work consists in advancing with all speed his best pupils, and getting examinational results from the brilliant, and giving "average attention" to the dull, to "give them a chance". The whole attitude requires a change. To Dr. Lincoln, as a medical man, it is the dull, listless, defective child that claims special attention. When the teacher begins to take a similar interest in the bottom boys of his form, as being the special glory of his art, it will not merely be good for the dull and the stupid, but there will follow an insight into the best methods of teaching and training the best boys as certainly as, by the laws of economics, rent of land increases according as the advantageous conditions of its cultivation increase over the land which is good enough to just repay cultivation. Dr. Lincoln's convincing exposition of the educability of children of ill-regulated minds and of the most attenuated powers is optimism of the most inspiriting kind to the teacher of children of ordinary and higher mental power.

We have attempted to point out the significance of Dr. Lincoln's book to the educator, but it is with regard to education of defectives by

special treatment by the doctor, the teacher and society that his book is directly and principally concerned. The chapters are entitled, The Outlook, The Nature of Mental Derangement, Degeneracy, Education, Self-Education, Our Social and Civic Duties. The work is an introduction to the subject. It is as little technical as could be. It is lucid and succinct in exposition and, as we have said, it gives ground inferentially for a highly hopeful outlook for the future of education under the most advantageous conditions.

FOSTER WATSON.

The Methods of Ethics. By HENRY SIDGWICK, sometime Knightbridge Professor of Moral Philosophy in the University of Cambridge. Sixth edition. London: Macmillan & Co., Limited; New York: The Macmillan Co., 1901. Pp. xxxvi., 526.

Prof. Sidgwick began the revision of *The Methods of Ethics* for this edition, and carried it through up to page 276. The illness, which was so soon to terminate fatally, prevented him from carrying it further, and the rest of the book was, by his wish, seen through the press by Miss E. E. C. Jones.

The chief changes in this edition are to be found in chapters i.-v. and ix. of book i., and chapters iii. and vi. of book iii., in the addition of an Appendix on, "The Kantian Conception of Free Will," and the inclusion in the Preface of the brief history of the development of Prof. Sidgwick's ethical view, which was printed in the Notes in MIND for April last. The account which appears in the Preface, however, differs slightly from that in MIND, as after the latter was printed a page which had been mislaid was recovered, and was found to fit the gap conjecturally filled by the passage in square brackets on page 290. The passage beginning, "But reading him at this stage," now runs as follows:—

"But reading him at this stage with more care, I found in him, with pleasure and surprise, a view very similar to that which had developed itself in my own mind in struggling to assimilate Mill and Kant. I found he expressly admitted that 'interest, my own happiness, is a manifest obligation,' and that 'Reasonable Self-love' [is 'one of the two chief or superior principles in the nature of man']. That is, he recognised a 'Dualism of the Governing Faculty'—or, as I prefer to say, 'Dualism of the Practical Reason,' since the 'authority' on which Butler laid stress must present itself to my mind as the authority of reason, before I can admit it.

"Of this more presently: what I now wish to make clear is that it was on this side—if I may so say—that I entered into Butler's system and came under the influence of his powerful and cautious intellect. But the effect of his influence carried me a further step away from Mill: for I was led by it to abandon the doctrine of Psychological Hedonism, and to recognise the existence of 'disinterested' or 'extra-regarding' impulses to action, [impulses] not directed towards the agent's pleasure [*cf.* chapter iv. of book i. of *The Methods of Ethics*]. In fact as regards what I may call a Psychological basis of Ethics, I found myself much more in agreement with Butler than Mill.

"And this led me to reconsider my relation to Intuitional Ethics. The strength and vehemence of Butler's condemnation of pure Utilitarianism, in so cautious a writer, naturally impressed me much. And I had myself become, as I had to admit to myself, an Intuitionist to a certain extent. For the supreme rule of aiming at the general happiness, as I had come to see, must rest on a fundamental moral intuition, if I was to

recognise it as binding at all. And in reading the writings of the earlier English Intuitionists, More and Clarke, I found the axiom I required for my Utilitarianism, [That a rational agent is bound to aim at Universal Happiness], in one form or another, holding a prominent place (*cf. History of Ethics*, pp. 172, 181).

"I had then, theoretically as well as practically, accepted this fundamental moral intuition; and there was also the Kantian principle, which I recognised as irresistibly valid, though not adequate to give complete guidance. I was then an 'intuitional' moralist to this extent: and if so, why not further? The orthodox moralists such as Whewell (then in vogue) said that there was a whole intelligible system of intuitions: but how were they to be learnt? I could not accept Butler's view as to the sufficiency of a plain man's conscience: for it appeared to me that plain men agreed rather verbally than really."

The Meaning of Good. By G. Lowes Dickinson. Glasgow: James Maclehose & Sons, 1901. Pp. xvi., 231.

A new Philosophical Dialogue is a thing somewhat unexpected. The task of harmonising good drama and good reasoning is naturally not an easy one, and has often ended in failure. Yet the work before us is by no means a failure. This result is no doubt largely due to Mr. Lowes Dickinson's skill, but it is open to question whether with different aims he would have been equally successful. As it is, his purpose being suggestive and not dogmatic, one agrees that he has chosen the literary form best suited to it, and agrees all the more readily because the dialogue exhibits no lack of dramatic feeling. In fact its author seems equally accomplished in the parts of Socrates and of Plato.

With the general position of the whole work it is difficult to find fault; but for this very reason the first book is perhaps more valuable than the second. If the discovery of Good is a progressive interrogation of experience, we cannot find The Good till experience is complete. All attempts to fill in the content of the Perfect State must necessarily be unsatisfactory, because experience is incomplete. Life as we know it is not perfect, and cannot for that reason supply the content of a perfect life. In actual practice we do, and of course must fill in the content of heaven by selecting from our experience the elements that we most prize in it, but no one can say that the result is satisfactory. Our thoughts of heaven vary with our moods. To-day we may be in an energetic mood and look forward to a heaven of activity, while to-morrow we may be more inclined to sympathise with the weary charwoman who addressed her friends with her last breath:—

> 'Don't mourn for me now, don't mourn for me never;
> I'm going to do nothing for ever and ever'.

Nevertheless it is difficult to imagine a better guess at heaven than that offered by Mr. Dickinson.

Mr. Dickinson is not so clear in his use of the term 'Good' as one could wish. Here and there a contrast is implied between The Good and Moral Good, and in one place the latter is spoken of as merely a means to the former. But if The Good is what it must mean—that which gives complete satisfaction, it will satisfy our whole nature, which surely must include our moral nature. No doubt in life as we experience it, there is a want of harmony between the different values which we set on things, and for this reason life entails a certain amount of sacrifice. We can't get all we want, and so we have to take what is most worth taking

and discard the rest. What is morally good is often unpleasant; and in spite of Keats who tells us that all we need to know is that

Beauty is Truth, Truth Beauty,—

Reality is often ugly enough. But this is certainly because what is is imperfect. Such experience affords no test of The Good, which is *ex hypothesi* perfect. Ideally the Right, the True, the Beautiful, and the Pleasant must coincide, and The Good must include them all. Even with experience as it is the right course may be the pleasant one.

For similar reasons, though one agrees with Mr. Dickinson, that The Good is not to be identified with The Beautiful, yet surely we cannot imagine a Perfect Good that is not beautiful, just as surely as we cannot imagine a Perfect Good that is not pleasant or real.

The dialogue is interesting throughout, touching as it does on a number of important questions, and contributing to most of them some valuable observations. One of these may be quoted in conclusion. 'Life is a dangerous thing, and nothing we can do will make it safe. Our only hope is courage and sanity.'

E. V. Slater.

Whence and Whither. By Dr. Paul Carus. Kegan Paul, Trench, Trübner & Co.

This little book professes to be an investigation into the nature of the soul, its origin and its destiny. The author sets out with the boast that he intends 'to systematise the facts without resorting to hypothetical assumptions' whether religious or metaphysical. But in spite of these brave words he is soon found floundering in the morasses of dogmatism. 'The soul,' he tells us, 'is not that which feels and thinks and acts, but is the feeling itself, the thinking itself, the acting itself.' We must not say 'I think,' but use the impersonal, 'It thinks,' just as we say 'It rains'. Yet the soul is defined as 'a complex organism,' 'a system of sentient symbols'. Again he says 'Man's thoughts are sentient images of the things and relations of the objective world; and thinking is simply a combining of these sentient images'. Yet he has no hesitation in grafting a kind of Platonic idealism upon this sensationalistic psychology. Ideas are the prototypes of existence; 'they have nothing to do with sense or sensibility; they are purely mental; they can be grasped by the mind only'. 'We do not produce ideas, but ideas produced in the cerebral processes of a brain become conscious and thus *they* produce *us*.' As a specimen of the author's power of definition we may quote the following: '*Heredity is the law that the same, so long as it remains the same, will in reproducing itself, continue to be the same*'. As a result of such speculations he concludes that the soul is a knot made of many and various strands—chemical elements, tendencies and ideas—our heritage from the past. At death the knot is loosened, but the strands still persist to be tied in other knots. Our criticism is already too long, but we must protest against this pernicious type of so-called religious treatise. Dr. Paul Carus has given us a most indigestible farrago of thoughts (or words) gathered from many philosophies, sciences and religions, richly seasoned with copious translations from German poetry, and served up in a phraseology, no less nauseous to common sense than to philosophy.

A. J. Jenkinson.

Truth and Reality. By John Smyth, M.A., D.Phil. T. & T. Clark, 4s.

This work was written as a thesis for the D.Phil. Degree of the University of Edinburgh, and it appears, from the author's preface, to have won 'the coveted honour'. Dr. Smyth regards the world from that idealist point of view, not uncommon nowadays, which despises 'the answers that Kant gave to his times,' and sneers at 'the hash of Hegelian dialectic,' and deems itself not incompetent 'to give a right conception of life for the present age'. He deals cursorily with naturalism and erroneous or defective idealistic theories. He disposes of the former 'in brief space,' not by meeting it upon its own ground, but by assailing it with the abstract arguments of the class-room, an artillery as noisy as it is ineffective. The latter are accused of leaving out of sight half the facts, of confining the spirit within the limits of the speculative reason, of ignoring error and evil. If the real is the rational, can we, asks Dr. Smyth, say that evil and error are rational, or can we deny that they are real? His solution of the dilemma is interesting. Evil and error are not unreal, but 'non-real,' to which category is added the world in space and time. While we have no quarrel with the author's aims, we cannot recommend the book. Its tone is bombastic; it abounds in irrelevancies; in phraseology it is excessively wordy; and we must confess to having frequently failed to unearth the meaning of a paragraph in spite of headings and summaries.

A. J. Jenkinson.

The Story of Nineteenth Century Science. By H. S. Williams. New York and London: Harper Bros. 1900. Pp. x., 475.

This work consists of an introduction on science at the beginning of the century, and of chapters dealing with astronomy, palæontology, geology, meteorology, physics, chemistry, biology, anatomy and physiology, scientific medicine, experimental psychology, and unsolved scientific problems. The 116 illustrations are, for the most part, portraits of eminent men of science. The book, as a whole, makes a good impression, which is not lessened by the provision of an excellent index.

We are here concerned with the chapter on experimental psychology—which is disappointing. Much space is devoted to the reform in methods of treatment of the insane, the early work on the medullated nerve fibre, cerebral localisation, and the histology of the nervous system. The only psychological topics touched on (and these are handled in the crudest way) are reaction time, Weber's law, and the state of hypnosis. The chapter furnishes one more proof of the difficulty which meets the student of natural science, when he seeks, from book knowledge only, to adopt the psychologist's standpoint. Half an hour's conversation with the workers in a psychological laboratory would have saved Dr. Williams from a misleading superficiality of treatment.

Intelligence in Plants and Animals. By T. G. Gentry. New York: Doubleday, Page & Co. 1900. Pp. 489.

"The possession of soul and spirit can be predicated no less of plants than of man and the lower animals." "In announcing this belief, the author but expresses a conviction as deep as any that could occupy a human mind." "We promised ourselves . . . a brief treatment of the most interesting life-forms of this planet of ours in the light of their ways and doings, and the direction of human thought to those traits of

character and manifestations of conscious intelligence which fit them to become partakers with man of that new life which awaits him beyond the grave." These quotations sufficiently indicate the purpose of the work under notice. The writer, seeking to follow in the footsteps of the late J. G. Wood, gives a series of instances of 'intelligence,' ranging from the Venus fly-trap through insects, fish and snakes, to the higher mammals and birds. He is evidently an ardent student of natural history, and especially well versed in bird lore. But his main thesis is untenable, and the scientific nature of his book is thereby impaired.

There are eight excellent photographic plates from nature, and many woodcuts of very various merit. The frontispiece, referred to as a portrait of the author, is labelled, Snapping Turtles Fighting. There is no index.

Truth and Reality, with Special Reference to Religion; or, a Plea for the Unity of the Spirit and the Unity of Life in all its Manifestations. By JOHN SMYTH, M.A. (New Zealand), D. Phil. (Edin.). With introductory note by Prof. R. FLINT. Edinburgh: T. & T. Clark, 1901. 8vo. Pp. xvii. + 244. Price 4s..

This is a dissertation submitted to the University of Edinburgh for the degree of Doctor of Philosophy and rewarded with that coveted distinction. The author commands our sympathy, both for what he maintains and for what he opposes, and also for the tone of moral enthusiasm which pervades his work. To quote his own words: "The writer's main aim is to point out that the roots of philosophy and of religion, as of morality and of natural science, lie in the constitution of the human spirit; and that, therefore, their questionings, methods, inquiries and results are as much a process of reason as is logic itself, and that their basis and objects belong truly to the constitution of things, if anything does". In the course of maintaining this thesis the author has just occasion to find fault both with naturalism and with the idealism which errs by laying stress upon the intellectual side of our nature only, to the neglect of other sides no less essential. As to the philosophic content of the work we cannot say it is commensurate with the enthusiasm of the writer. His is the fervour of the preacher who would call men to the truth by faith rather than the patient analysis of the thinker who dare not say he believes more than he proves by mere human reasoning.

HENRY STURT.

Les Approximations de la verité; étude de philosophie positive ou expérimentale. Par HERVÉ BLONDEL. Paris: F. Alcan, 1900. Pp. xii., 239.

The object of this study is to give a condensed account of the positivist philosophy, making allowance for the progress in science and speculation since the appearance of the *Cours de philosophie positive*. Although emphatic in his allegiance to positivist principles, M. Blondel repudiates Comte's later teaching. He argues that towards the end of his life the master was unfaithful to true positivism, and made dangerous concessions to mysticism and the recognition of the Unknowable. Thus M. Blondel is closely in alliance with the "hyperpositivism" of a better-known writer, M. de Roberty. Granted that this is a valuable form of philosophic doctrine, M. Blondel's book has value as a lucid and agreeable compendium. His explanation of psychology is that of biological sociology; and he regards the primary qualities of matter as unexplained, though hardly unexplainable.

Dix années de philosophie ; études critiques sur les principaux travaux publiés de 1891 *à* 1900. Par Lucien Arréat. Paris : F. Alcan, 1901. Pp. vi., 179.

This little volume skims lightly over the philosophical literature of the closing decade of the nineteenth century. The author has done a good deal of reviewing in French and American periodicals, and here we have apparently a *rechauffé* of his contributions. The material is very much that of the average book review, a short statement of the main points of the works dealt with, and a little discriminating criticism. English philosophy is almost entirely left out, the exceptions being the æsthetic writings of Prof. Haddon and Vernon Lee. But the book may have some usefulness in England as a short guide to what has been done recently on the other side of the Channel.

Prolégomènes à l'Esthétique. Par L. Dimier. Paris : Aux bureaux de la Revue de Metaphysique et de Morale. Pp. 37.

The author proposes to himself three questions :—

" Est il possible de fournir une définition du beau en soi ? "

" Peut on constituer l'esthétique sans le secours d'une telle définition ? "

" De la science constituée d'accord avec la réponse qu'on fait à ces deux questions, quel est le rôle et l'utilité taut à d'autres égards qu' à celui de la philosophie elle-même ? "

The answers which he provides to these questions are : to the first, that no such definition can be found because beauty-in-itself can only be a property of the thing-in-itself, of which we can know nothing : to the second, that since we certainly do attain to a certain phenomenal beauty, and since this, to which we always really refer by the name of beauty, is realised by definite processes of imitation, we can study these processes without a definition of beauty-in-itself : to the third, that Æsthetic thus constituted, avoiding any question as to what is metaphysically implied by imitation, will content itself with the elaboration of technical laws ; that the advantage of such a science to the artist is obvious ; that to the philosopher it will be at least as interesting as mathematics or natural science.

The conception of Æsthetic thus set forth seems to treat it less as a part of philosophy than as one of the sciences with which philosophy will deal.

Contenting itself with a registration of methods, of the rules of perspective for instance, and the harmonising and even the mixing of colours, it will relegate to philosophy such insoluble questions as the meaning of beauty and of imitation.

Though the author draws an analogy between this science of imitation and the sciences of logic and of morals, he surely should in strictness compare it only to grammar and to law. For not on their most formal side can logic and ethics entirely disregard metaphysical problems.

E. F. Carritt.

Mein Recht auf Leben. Von Dr. Heinrich Spitta, a. o. Professor der Philosophie an der Universität Tübingen. Tübingen, Freiburg in Breisgau und Leipsig : J. C. B. Mohr, 1900. Pp. xi., 468.

Both for the general reader and for those who are especially occupied with moral theory, Prof. Spitta's book is likely to have considerable

interest. The author's main thesis is the idea of immortality, with a defence of which in a peculiar form the work is for the most part taken up. By way of introduction there is also an attempt to show that the human struggle for life is not incompatible with morality, or rather that it is not even intelligible except as a field for the realisation of the moral purpose. While some good remarks are offered in this opening discussion, two points may perhaps provoke criticism. In the first place, though Prof. Spitta deals with the possible moralisation of the human struggle, he gives no suggestion as to the way in which the competition in the whole complex of living things is to be understood in accordance with a moral principle; and yet this seems a point that should be the very beginning of moral theory. And secondly, the author argues that the pursuit of science or of art cannot make a satisfactory content for the individual life. But reasonings of this sort always seem to prove nothing, or to prove too much; either the value of science and of art is really left unassailed, or in their fall morality is involved also. The sharp separation between truth, beauty and goodness cannot successfully be maintained; if absolute worth is denied to any one of the three, all unconditional worth is implicitly made impossible.

The treatment of the main thesis demands more examination. Prof. Spitta defends the Kantian postulate of immortality, but defends it in such a modified shape as threatens to deprive it of the chief force it had originally. The Kantian postulate of immortality really rested on this: since the command of duty is absolute and unconditional, a man must assume that he cannot be annihilated till he has fulfilled its bidding; but as the task can at no time be completely fulfilled by a finite will, therefore an infinitely prolonged existence must in each case be postulated. Prof. Spitta, however, postulates a future life on the ground that the individual moral task must somewhere be completely performed. But the future life demanded by this argument is only finite; death, taken in a metaphysical sense, is a little postponed, not removed altogether. There is wanting the nerve of the postulate; which is, divested of Kantian formality, the interest in continued moral struggle. If this struggle is at some time completely overcome, any further existence of the soul, since it is irrelevant, cannot be in a genuine sense postulated.

A more surprising thing in Prof. Spitta's treatment of the postulate is that he should have, in spite of the general warning given by Kant, carried it further, attempting to show that existence after death is required in such a way that we must assume the continuance of the soul in conditions similar to the present, *i.e.*, in other bodily lives which will form a series. In support of this view, the author adduces all kinds of testimony, including the not very reassuring sentence of Hume. But more than this is needed to make it clear that the theory really offers any solution of the moral problems. Prof. Spitta demands the final and definite completion of the moral task in the soul; but reincarnation does not guarantee such completion. And even if the end of the moral struggle be assumed as assured, then (as was said above) the question of immortality must be discussed afresh. Moreover the theory brings new difficulties of its own. To take only one, it is hard to see what is gained by reincarnation if the soul forgets the past. Apparently former states are wholly forgotten, as Prof. Spitta himself admits, for he is not ready to hazard Pythagorean recollections himself nor to accept them from others. And yet, if reincarnation is to be intelligible, the previous lives must be at some time remembered. The question naturally arises, how and when the soul will come to that needful reminiscence. Only the wildest assumptions can give an answer here; and to admit any one of

them is directly to give the lie to Spinoza's great hope of philosophy—*paulatim præcipitantia fingendi evanescet.*

As regards the method of the work, the author says in his preface: "Metaphysik im engeren Sinne habe ich nicht treiben wollen". Technical discussions therefore are not to be expected; and no doubt it is due to this that the metaphysical positions taken up have the air of being rather provisional, and sometimes a little vague. As far as style goes, the author must be congratulated on his clearness and facility; and the book, though perhaps somewhat disproportionately long, is throughout enlivened by a great play of quotations and allusions.

J. A. J. Drewitt.

Der Gesang der Vögel: seine Anatomischen und Biologischen Grundlagen. Von Dr. Valentin Häcker, Professor in Freiburg in Breisgau. Jena: Gustav Fischer. Pp. 102.

The main results of this interesting little work may be stated very shortly. Starting from the important physical fact, which is illustrated by appropriate diagrams, that in our singing birds the voice-organs of both sexes are essentially the same in kind, while those of the female are less strongly developed than those of the male (p. 27), Prof. Häcker, differing in this from Darwin, infers an original stage of voice-power in which the two sexes were exactly alike; a stage, that is, in which the power of true song was not as yet acquired by the male, and in which both sexes communicated with each other on equal terms, so to speak, and for the same purposes. Those purposes, most essential to the preservation of the race, he considers to have been in the main the keeping together of the members of a species in migration, or in the search for food; they were, in fact, the call-notes with which ornithologists are so familiar. From these notes the true song has gradually been developed in the male only; for among the singing birds it is almost invariably the male that performs the work of courtship, and the voice-power, once acquired, would naturally be developed more especially in the service of that passion which is the most intense in all animals (p. 57). Thus a dimorphism of the two sexes in regard to the voice-organs has begun, and is no doubt increasing.

With regard to the songs themselves, and their use for the preservation of the species, Prof. Häcker distinguishes the song in courtship, of which the use is obvious, the song after courtship and during the nesting-time, when it is used to keep the sexual activity, especially of the female, at its full height, and thirdly, the extra-nuptial song, heard after the moult in the case of some species, and even in mid-winter, of which the value is not so clear (p. 51). Darwin looked upon it as practice of the voice, in order to retain the power: Spencer and Wallace rather as the expression of an overflowing vitality or of physical comfort; and in both these explanations Prof. Häcker seems to see probability. The autumn and winter singers need, however, to be more carefully observed before we shall be able to come to any very definite conclusion as to the meaning of the song at this season: and herein lies a good field of careful observation and record for the ordinary field ornithologist.

Monistische Gottes- und Weltanschauung. Versuch einer idealistischen Begründung des Monismus auf dem Boden der Wirklichkeit. Von J. Sack. Leipzig: Engelmann; London: Williams & Norgate, 1899. Pp. viii., 278.

Mr. Sack begins his philosophic profession of faith with the well-worn formula of Kantian agnosticism: "Logical reasoning can tell us nothing about supersensuous realities; it can only take account of phenomena". As we cannot resist our impulse to explore these realities, he concludes that we must use a method of analogy; we must regard the human soul as analogous to the cosmic soul and reason from one to the other. From this programme we might expect a criticism of the content of human consciousness with the object of ascertaining what elements may be attributed to the world-consciousness and what is merely finite and human. No such criticism, however, is attempted. The author merely picks up organic development, æsthetics, morality and religion one after the other, and gives a short genetic and theoretic account of each. What he has to say about them is by no means original. He makes no real contribution at all to the doctrine of monism, and his whole performance lacks point and unity to a surprising degree.

Minorenni Delinquenti. By Lino Ferriani. Milano: Max Kantorowicz, 1895. Pp. 570.

Delinquenti Scaltri e Fortunati. By Lino Ferriani. Como: Omarini Vittorio, 1897. Pp. 578.

Delinquenti che Scrivono. By Lino Ferriani. Como: Omarini Vittorio, 1899. Pp. 342.

Nel Mondo del Infanzia. By Lino Ferriani. Milano: L. F. Cogliati, 1899. Pp. 173.

Delinquenza Precoce e Senile. By Lino Ferriani. Como: Omarini Vittorio, 1901. Pp. 460.

All these volumes are studies in criminal psychology. Mr. Lino Ferriani the author of them is a distinguished Italian judge, and all his studies are based on his practical experience of the Italian criminal classes. What he finds as characteristics of the Italian criminal cannot in all respects be generalised into characteristics of the criminal population of all countries. Just as each country produces a distinct psychological type peculiar to itself, so does it also produce a criminal type which is distinctively its own. General racial characteristics differentiate the Italian criminal from the English criminal. And these racial characteristics combined with different social conditions and social customs also differentiate Italian crime from English crime. It is probable for instance that racial character and temperament and the social customs which are to a considerable degree the outcome of them are the principal reasons why crimes of passion in the shape of homicide and assaults upon the person are more prevalent in Italy than in England. The hot and impulsive temperament of the south combined with the circumstances in which it moves, produces a type of criminal peculiar to Italy, and where the Italian school of criminal psychologists have gone wrong is in attributing to criminals as a whole the mental and moral characters which they discover among the criminal population of their own country. Before criminal psychology can formulate laws applicable to criminals as a class, it must first of all take account of the characteristics peculiar to criminals of various nationalities. It is only after this has been done that we shall be able to get at the characteristics common to criminals

of all communities. In other words it is only by the comparative method that we can ultimately arrive at a sound and satisfactory criminal psychology.

It is from the point of view of comparative criminal psychology that Mr. Ferriani's volumes are so valuable to the non-Italian student. They deal exclusively with Italian criminals. They show the workings of the Italian criminal mind. And they possess the inestimable value of being studies at first hand. Mr. Ferriani speaks of what he has heard and seen himself. His studies are almost entirely confined to offenders who have come before the tribunal over which he presides himself. This gives them a peculiar and pre-eminent value, and distinguishes them from a great deal of second-hand opinion which parades itself before the public as criminal psychology. In the criminal cases that come before him Mr. Ferriani has made it his business to go as deeply and thoroughly as he could into the character and circumstances of the offender. He has looked behind the crime at the person of the criminal. The crime is the outcome of the characteristics of the criminal personality. He has accordingly made the personality of the criminal the object of careful and exhaustive examination. The first volume on the list, entitled *Minorenni Delinquenti* is a careful and elaborate study of two thousand juveniles who have come before Mr. Ferriani in his official capacity as a judge. In the collection and presentation of his data Mr. Ferriani has had several objects in view. He has given prominence to those points in juvenile offenders which he considers would be most valuable to the psychologist, the student of sociology and the legislator. In the purely psychological part of his work Mr. Ferriani deals with the tendency to crime among juveniles and of the various mental factors which actually produce it. The examination of these factors leads him to discuss some of the more prominent mental characteristics of criminal children, such as the want of moral sense, the want of modesty, the tendency to falsehood, to cruelty, to anger, to jealousy, to vanity, to envy, to hate. He also discusses the questions of suggestion and imitation, and the effects of heredity and alcoholism on the juvenile delinquent. Crime is the result of social conditions as well as mental and physical factors, and Mr. Ferriani gives a careful description of the adverse social and economic conditions which so often lead to juvenile delinquency. The volume closes with a sketch of some of the principal reforms which in Mr. Ferriani's opinion would lead to a reduction of the proportions of juvenile crime. A work of a somewhat similar character to the first is Mr. Ferriani's *Nel Mondo del Infanzia*. It is much less elaborate in its treatment of the subject, and is intended to interest parents who have neither time nor disposition to study more scientific treatises. This volume deals chiefly with the best methods of instructing the young and preparing them for the actual duties of modern life. The author is of Victor Hugo's opinion that the true thermometer of a nation's civilisation is to be seen in the manner in which the youth of the nation is instructed and prepared for the tasks of life. In Mr. Ferriani's opinion many parents are extremely ignorant of the character and disposition of their own children, of their aptitudes and weaknesses. In the study of child character he adopts the maxim that nothing is puerile in the world of childhood. The whole conduct of a child down to the smallest details is an index of its character and temperament, and it is by this index that a parent is to be guided in the education of the young. *Nel Mondo del Infanzia* is a series of essays written at various times, and the treatment of the various matters relating to childhood is therefore not so systematic as if the book had been written with one

predominant purpose in view. But it is none the less interesting on that account. In fact it is a little volume full of wise suggestions to parents, and penetrated with a spirit of deep sympathy and solicitude for the young and helpless.

Mr. Ferriani's latest volume, *Delinquenza Precoce e Senile*, was only published a few weeks ago. It is also described by the author as a study in criminal psychology. The book is dedicated to Prof. Lombroso and is dominated to a large extent by Lombroso's conception that the criminal like the poet is born not made. Mr. Ferriani in fact goes so far as to say that in this volume Lombroso's thesis respecting the born criminal receives a new and luminous demonstration. In support of Lombroso's contention Mr. Ferriani produces evidence to show how criminal parents beget criminal children and in this fact he sees an exhibition of the laws of atavism, of morbid heredity, and of family degeneration. There is no doubt about the fact that the offspring of wretched and degraded parents are more likely to become offenders against the criminal law than the children of parents living under normal social and physical conditions. But this does not settle the question as to whether the tendency to crime is an inherited tendency born with the individual, or whether it is a tendency produced by adverse parental, social and economic conditions outside the offender, or, lastly, whether crime is a product of adverse hereditary and social circumstances acting in combination and perhaps incapable of being analysed into their respective elements. It is probable that the question of the born criminal is an insoluble one. Who can measure the extent of external influences such as suggestion, imitation, example, and so on, on the highly impressionable mind of a child? And, on the other hand, how are we to measure the action of heredity? Until these preliminary steps have been taken it is impossible in each particular instance to say to what extent a child's conduct is the result of inborn disposition and to what extent it is the outcome of circumambient conditions. And so long as we are unable to separate what has been inherited from what has been acquired we shall be unable to determine whether the born criminal exists or not. These remarks, however, do not detract from the value of Mr. Ferriani's latest work. It is in many respects his ripest production. It is full of facts, full of thought, and sheds a considerable amount of light, especially upon the somewhat obscure problem of senile crime.

Delinquenti che Scrivono is, as its title implies, an attempt to deduce criminal character from the letters of criminals and from criminal handwriting. The material is divided into several groups corresponding to the crimes to which the writers of the letters were addicted. Thus we have an examination of the letters of precocious offenders, of criminals convicted of sexual offences, of thieves and forgers, of offenders against the person. The book opens up an interesting sphere of study. But the subject is as yet too new to possess many assured results. Mr. Ferriani is, however, to be congratulated on the painstaking manner in which he has collected his documents and on the skilful deductions which he draws from their contents. *Delinquenti Scaltri e Fortunati* is explained by its title, and is an excellent discussion on clever and successful criminals, and on persons of the same type who succeed in keeping within the ordinary law. It is not a book which admits of being easily summarised, dealing as it does with vice as well as actual crime. *Delinquenti Scaltri e Fortunati* is a wonderfully clear revelation of the sombre side of modern civilisation and of the immense work which remains to be done before society is purged of its parasitic and deleterious elements. It is impos-

sible to conclude this notice without an expression of sincere thanks to Mr. Ferriani for his admirable series of monographs on the criminal population. It is very seldom that we find a writer so excellently equipped for his task, and it is to be hoped that his name will become widely known among all students of criminal phenomena outside Italy.

W. D. Morrison.

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VII.—PHILOSOPHICAL PERIODICALS.

Philosophical Review. Vol. ix. No. 6. **H. N. Gardiner.** 'The Early Idealism of Jonathan Edwards.' [Brief account of the notes on 'The Mind' and on 'Natural Science,' with analysis of the article 'Of Being' contained in the latter. "That which truly is the substance of all bodies is the infinitely exact and precise and perfectly stable Idea in God's mind, together with His stable Will that the same shall gradually be communicated to us and to other minds according to certain fixed and exact established methods and laws." This is not derived from Berkeley: similar ideas do not occur in him before the Siris of 1744. Edwards draws rather from Locke, Newton and Cudworth. The early metaphysics persists in the later theology.] **F. Thilly.** 'Locke's Relation to Descartes.' [In combating innate ideas Locke is combating Descartes; the Cartesians; Herbert of Cherbury, More, Cudworth, Gale; and all possible arguments in their favour. The essence of the mind is thinking: thinking, for Descartes, is consciousness: hence the mind must be conscious of what is in it, and every innate idea or truth must always be known in every mind. As there are no such ideas and truths, the mind is an empty tablet. Locke thus refutes Descartes upon the Cartesian premisses. He himself does not, of course, believe that the mind is always thinking.] **W. Fite.** 'Contiguity and Similarity.' ["A consistent definition of the law of contiguity demands that it refer solely to the simultaneous excitation of elements within the same brain; as referring to mental states, it presupposes the factor of mental activity. But a consistent definition of the law of similarity includes a mental activity which defines the kind of similarity meant; and association by similarity cannot be expressed in any known physiological terms."] **R. B. Perry.** 'The Abstract Freedom of Kant.' [In the first *Kritik* freedom is connected with the irreducible fact-aspect of any phenomenon. Freedom "is the eternal freedom to be otherwise than it is, enjoyed by the universe as a whole, and participated in consciously or unconsciously by all the members of the universe". In the *Kritik of Judgment* a man is free in the sense of having his eternal nature consciously determine his act. Kant thus "denies dual possibilities, or genuine alternatives, and substitutes the negative principle of the absence of external determination".] Reviews of Books. Summaries of Articles. Notices of New Books. Notes.

Psychological Review. Vol. vii. No. 6. **H. C. Warren.** 'The Fourth International Congress of Psychology.' [Emphasises the fact that "the barriers of language were surprisingly strong". General summary of topics handled. The fifth congress will be held at Rome in 1904, with Prof. Sergi as president.] **E. Thorndike.** 'Mental fatigue.'—II. [(1) Mental fatigue in school children. Danger of confusing ability to work with readiness to work; of neglecting the practice increment; of emotional excitement; and of slight differences in the giving of tests. Tests given: multiplication, spelling, memory of figures,

nonsense syllables and letters, reproduction of forms, counting dots. "Any difference in the ability of scholars to do mental work due to two hours or more of ordinary school work without long rest, or four hours with a rest of one or two hours inserted, would have been detected by these tests": none was found. The decrease in work done during the last part of the school day is due to bad teaching. (2) Continuous mental activity, in some cases for eight hours. No impairment of mental function observable. (3) Measure of physical strength, at beginning and end of the day's work. No decided decrease of physical power observable.] **M. W. Calkins, H. Buttrick,** and **M. M. Young.** 'Wellesley College Psychological Studies: An Attempted Experiment in Psychological Æsthetics.' [Three pictures shown, by method of paired comparison, to kindergarten and older children, and to college freshmen and seniors. The first is coloured; the second has beauties of line, light and shade; the third is highly associative. General results: it is impossible to draw absolute distinctions between child and adult. Children are characterised simply by attention to parts with neglect of whole; not by any given type of preference.] **C. E. Seashore** and **M. C. Williams.** 'An Illusion of Length.' [Drawing of double and half squares to a standard vertical, of double and half horizontal lines to the same standard, and of horizontal multiples of a standard horizontal line or point-distance. The double is underestimated in all work with lines; eye-movement is a primary, contrast a secondary explanation. The illusion does not vary constantly with the size of the object.] Discussion and Reports. **C. L. Franklin.** 'The Dissimilarity in Function of the Rods and the Cones of the Retina.' [Discussion of the results of von Kries and Nagel, *Zeits. f. Psych.*, 1900. The rods are the organ for nothing but achromatic vision; colour is mediated by the cones only.] **C. H. Judd.** 'The Illusion of Deflected Threads.' [Reply to Pierce. Separation *versus* fusion of images.] **F. H. Verhoeff.** 'The Space Threshold by the Pseudoscopic Method.' [Since Stratton obtained a limen of 24″ for binocular relief with the pseudoscope, he obtained it practically by doubling his interocular distance. Hence the true limen is 48″, which agrees with former determinations.] **G. M. Stratton.** 'Reply.' [Independent work by another method gives 7″ for 24″; and the relief at 24″ holds without the pseudoscope.] **J. A. Bergström.** 'A Magnet Registration Key.' [Description and cut.] Psychological Literature. New Books. Notes.

Psychological Index. No. 7. 'Bibliography of the Literature of Psychology and Cognate Subjects for 1900.' [Issued in March, 1901. Contains 2,627 titles: the Index for 1899 had 2,584. Omissions are obvious, but with the early date of issue could hardly have been avoided.]

American Journal of Psychology. Vol. xi., No. 4. **N. Triplett.** 'The Psychology of Conjuring Deceptions.' [(1) The origin of conjuring: the instinct to deceive; mimicry and death feigning; deceptions in children; priesthood, and the relation of deception to conjuring. (2) Modern conjuring: classification of conjuring deceptions; analysis of typical tricks. (3) The preparation of the conjurer. (4) Psychological justification of the rules and practices of the conjurer: attention (gesture and 'patter'); perception and apperception; suggestion and association (suggestions of repetition, of confidence and obedience); suggestion and the law of economy. (5) Sociological and pedagogical observations: interest in conjuring deceptions; law of diminishing intensity of feeling; motor training; responsiveness of the audience.] **S. S. Colvin.** 'The

Fallacy of Extreme Idealism.' ["We cannot view the universe from the point of extreme realism, which posits the thing-in-itself, an unthinkable and useless nothing. Neither are ideas as such capable of building a universe. . . . The only thing that we can attach truth to is that which is causally active. . . . Force, energy, activity, will . . . is the most fundamental fact in our experience. . . . Being is that which acts, and ultimate reality is a system of ordered activity, in which every part is related to every other part."] **E. J. Swift.** 'Visual and Tactuo-muscular Estimation of Length.' [Sight is the more accurate; and visual memory is, for a short time at least, more accurate than tactual-motor. In judging short lengths, there is a tendency to underestimation both in sight and in touch. Visual judgments are regular, tactual-motor irregular.] **M. Meyer.** 'Remarks on C. Lloyd Morgan's Paper: "Relation of Stimulus to Sensation".' [Corrects Morgan's ideas of Weber's law, and criticises his procedure.] **F. H. Saunders** and **G. S. Hall.** 'Pity.' [Questionnaire material. (1) Pity in real life: hunger; cold, shelter, clothing; weakness, innocence; sickness, deformity, death; poverty, vice, crime; fire, water; spinsterhood, old age; sympathy with animals, plants, inanimate nature; pathetic effect of natural sounds. (2) Pity in art and literature: music, fiction, the life of Christ; depression at twilight; autumn; regret, self-pity. (3) Psychological: pedigree of pity; symptomatic effects; man *vs.* woman; complexity of the psychosis. (4) Educational: excessive and morbid pity; the art of comforting; specialisation of pity; pity fetiches; irradiation and diffusion of pity; friendship and love; personal experience in grief; imagination as a factor in pity; expression of pity; 'pitying aright' compared with fearing aright, being angry aright. "Pity has its highest office in removing the handicaps from those most able to help man to higher levels. . . . The mission of pity in the world to-day is to minister to the needs of élite youth, at the stage of later adolescence, when their development is so easily arrested, but at that age when the prolongation of educational incentive and opportunity would give them careers in the upper stories of human endeavour, where both need and service are greatest."] Psychological Literature. Books received.

International Journal of Ethics. Vol. xi. No. 2. **L. G. Ritchie.** 'War and Peace.' [We must always reckon with the possibility of war, which is as defensible morally as the forcible repression of domestic crime. In estimating the justice of wars we cannot rely on any abstract rule, but must ask: Which of the conflicting forces was making for constitutional government and for social progress? War to get empire may be justifiable, if the resulting Empire be a higher type of commonwealth than the small communities absorbed thereby. The termination of war may be brought about by a federation of European Empires.] **J. J. Chapman.** 'The Unity of Human Nature.' [The moral conduct of every individual influences all the rest of the world. Hence it is important that each individual should combat the forces of evil. To compromise with evil in one's youth jeopardises one's moral future.] **W. R. Sorley.** 'Henry Sidgwick.' [A shortish biographical and critical appreciation.] **F. H. Hayward.** 'The True Significance of Sidgwick's *Ethics*.' [Sidgwick adhered to the English tradition of empiricism. His special merit is his honest and searching criticism; his one failing is his comparative neglect of Green's idealism. He is very eclectic and in particular has borrowed largely from Kant, especially in his treatment of Reason. While formally adopting a species of Hedonism, Sidgwick has frankly exposed its contradictions, and thereby done a great service to Idealism.] **Tokiwo Yokio.** 'Education in Japan.' [An account of

Japanese education, with statistics and suggestions for improvement. A system of ethical teaching is the chief desideratum.] **G. M. Stratton.** 'A Psychological Test of Virtue.' [A criticism of Prof. Dewey's test which is that an action is morally good when it springs from our whole nature. The test is true, but it is not psychological. For it is not psychology, but ethics, that can decide what our "whole nature" is.] **F. J. Gould.** 'Children's Ethical Classes.' [In such classes the sexes should be mixed. Their deep emotions should not be worked on. The teacher should be adequately trained. The co-operation of the parent should be secured. The child's imagination and moral judgment should be strengthened. The inspiration of moral instruction should be the idealisation of humanity. We greatly need a collection of suitable materials for teaching. The instruction should be dramatic in form, suitably graded for pupils of different ages.] **J. A. Nicklin.** 'The Greek View of Life.' [The Greek view is best represented by Aristotle's *Ethics*, who makes happiness the end of life, but a happiness whose chief constituent is wisdom. Such a view gives us the highest idea of the gifts of the Greek nation: its failing is that it is satisfied with human happiness, whereas Christianity aspires after the unattainable.] Book Reviews.

Revue Philosophique. January, 1901. **V. Brochard.** 'La Morale Ancienne et la Morale Moderne.' [It is a mistake to suppose that modern ethics, with its central idea of an external command, has *superseded* the classical systems, whose aim was the determination of the Good: rather the latter, depending on Reason alone, are the foundation of true Ethics, while the former, in so far as it rests on religious conceptions, is a more popular expression of the same fundamental idea.] **F. le Dantec.** 'La Définition de l'Individu.'—I. [Biology cannot answer the question of Polyzoïsm, which becomes most important when it refers to man, "Is man an individual or a colony of individuals?" until it has a fixed definition of "individual". This is given neither by indivisibility, nor by community of origin: the individual is "a living mass whose form is hereditarily obligatory".] **Sokolov.** 'L'Individuation Colorée.' Notes et discussions. **P. Tannery.** 'Sur la question de l'infinitude de l'univers.' Revue critique. Analyses et comptes rendus: Revue des périodiques étrangers. February, 1901. **F. Pillon.** 'La Mémoire affective: Son importance théorique et pratique.' [Emotional memory is distinct from new emotion caused by revived ideas, and exists in various degrees of concreteness. Moral and religious education should take account of it, for the tenacity with which ideas are held depends on their power of reviving emotion.] **Manxion.** 'La vraie Mémoire affective.' [True emotional memory depends only on association between the original causes (ideal or sensational) and their accompanying emotional state, and differs from new emotion, whose intensity depends on the vividness of the representation of the former causes.] **F. le Dantec.** 'La Définition de l'Individu.' —II. [Hereditary transmission of acquired characteristics is necessary for the individualisation of a group of cells. The cells forming a pluricellular individual are different from apparently similar ones forming a colony, the form of their grouping, as well as their separate natures, being determined by heredity: hence the question of Polyzoïsm becomes that of polyzoïstic *origin* only, *viz.*, "can a pluricellular individual arise from the progressive individualisation of what was originally a colony?" The hypothesis that it can seems probable.] Revue générale. Analyses et comptes rendus. Revue des périodiques étrangers. March, 1901. **Dr. Grasset.** 'Le Vertige: étude physiopathologique de la fonction

d'orientation et d'équilibre.' **Ch. Dunan.** 'Les Principes de la Morale. —I. Le Souverain Bien.' [Ethics rests on Metaphysics: for only by a theory, not empirically attainable, of the relation of man to man and of the individual to the universal can altruism and egoism be reconciled. The condition of perfect existence for each individual is union with the whole of creation. True self-love, which is not opposed to love of others, demands the recognition of a hierarchy of functions and of pleasures.] Discussions. **R.-P. Sertillanges.** 'La Morale ancienne et la Morale moderne.' **Evellin** et **Z.** 'Sur l'Infini Nouveau.' Analyses et comptes rendus. Revue des périodiques étrangers.

Zeitschrift für Psychologie und Physiologie der Sinnesorgane. Bd. xxiv., Heft 5. **A. Netschajeff.** 'Experimentelle Untersuchungen über die Gedächtnissentwickelung bei Schulkindern.' [Experiments (687 children, nine to eighteen years of age) on visual impressions, sounds, numbers, three-syllable words denoting visual objects, similar words denoting sounds, similar words denoting objects of the cutaneous, temperature and muscular senses, similar words denoting affective states, and abstract words, supplemented in the case of 350 of the older children by a short questionary. Results: memory improves with age; the meaning of words is a condition of their retention; there is an analogy between the modes of development of the number and the abstract-word memories; the extensive development of the various memories differs (objects and affective words are best, numbers worst remembered). Further, boys have a better memory for real impressions, girls for numbers and words; the greatest sex difference obtains in the period eleven to fourteen years of age. Children of visual and motor type have a better average memory than other children of the same age and school; those of the auditory type fall below the normal. The influence of word-meaning is greatest in memories of the visual type.] **O. Raif.** 'Ueber Fingerfertigkeit beim Clavierspiel.' [The second and third fingers can make five or six, the other fingers four or five strokes in the second; the practised trill has eight to twelve tones in the second, each finger making four to six movements. Piano players do not surpass other persons in rapidity of finger movement. Experiments show that the rate of movement of the separate fingers does not increase with practice: what is wanted in piano playing is, therefore, not finger-readiness but thought-readiness.] Literaturbericht. Bd. xxiv., Heft 6. **C. Ritter.** 'Ermüdungsmessungen.' [Griesbach's æsthesiometric method and the arithmetical method condemned by Ebbinghaus are rejected; Ebbinghaus's combination method is left untested from lack of opportunity. The method of dictated words is available: dictation of numbers and of sentences is to be rejected. The method of cancellation of determinate letters and words in like printed texts is also available. Two attempts were made to utilise the school work itself: the Greek-exceptions hour was divided into two periods, and short sentences of equal length and difficulty were laid before the pupils for memorising. The result in the first case is doubtful, in the second promising. Remarks on other attempted methods, and on individual (as distinct from class) tests.] **L. Edinger.** 'Hirnanatomie und Psychologie: Entgegnung an Herrn E. Storch.' [The author had not intended to approach psychology by way of anatomical method or result, but merely to show that and how anatomy and physiology may some day prove useful to the psychologist. Literaturbericht. Namenregister. Bd. xxv., Heft 1 und 2. **S. Witasek.** 'Zur psychologischen Analyse der aesthetetischen Einfühlung.' [Attempts to show that æsthetic sympathy (*Einfühlung*) "consists essentially in an ideation of psychical facts, for the most part emotional

in character"; *i.e.*, defends the theory of ideation as against the theory of actuality. (1) Proofs that ideation of psychical facts ('thinking of a thought') is possible; that the distinction between ideas of perception and ideas of imagination holds for it as for ideation of physical facts; and that ideation, in the one case as in the other, may be representative (pictorial) or symbolic (*anschaulich* or *unanschaulich*). (2) Laws of the origination of ideas (perception; imagination, due to association; voluntary action, volitional association or apperception; objects of a higher order, consolidated contents or form qualities) and of feelings (ideas and judgments serve as the presupposition, *Voraussetzung*, of feelings). The two functions of the presupposition of feeling: the phenomenal, shown when we are glad *of* something, or pleased *with* something; and the causal, shown when we can refer the feeling to the presupposition as we refer the second member of an association to the first. What, then, is the presupposition of the feelings which the theory of actuality assumes? Analysis of instances: detailed consideration of the 'reading oneself into' (*Sich-hineinversetzen*) the position of the æsthetically considered personality, and of the 'transference of feeling' to the contemplated object (Stern). In both cases the actuality theory breaks down: the train of ideation set up by the æsthetic object (always including the idea of feeling) furnishes the explanation of æsthetic sympathy. (3) The mechanism of sympathy in terms of the theory of ideation. This section raises and answers the questions: What is the object of æsthetic sympathy? What are the psychical facts that constitute sympathy? What are the data of perception that arouse sympathy? What are the psychological laws under which this arousal takes place? Noteworthy, but too long for summary, is the discussion of the æsthetic effect of music. The general result is that *Einfühlung* obeys the laws of ideation: we thus have positive confirmation of the negative result just reached, that it does not obey the laws of feeling. (4) Sympathy is not identical with the æsthetic attitude at large. "Where sympathy co-operates in the production of the æsthetic attitude, it is, as representative ideation of psychical facts, presupposition of the æsthetic feeling."] **E. Berger.** 'Ueber stereoskopische Lupen und Brillen.' [Impressed by the utility of binocular vision in such instruments as the stereoscope, the opera glass, the double telescope, etc., and by the damage done to vision by the single watchmaker's lens and similar appliances, the author set to work to devise a double lens which should be useful in delicate mechanical work. He gives a full optical discussion of the double lens, showing, among other things, its power to correct astigmatism; and also recommends stereoscopic spectacles, with decentred concave and convex lenses, for presbyopia, myopia and hypermetropia. Diagrams of the course of the light rays are given throughout.] **M. Straub.** 'Die normale Refraction des menschlichen Auges.' [Variation of refraction, except at the beginning and end of life, is apparent only, and is caused by a tonus of the ciliary muscle. Refraction is subject to great individual variation in infancy, but tends towards a constant value as time goes on. Nature strives towards an ideal refraction (that of emmetropia), correcting the deficit of refraction (normal hyperopia) by tonus of the ciliary muscle. This emmetropisation is (apart from pathological cases, *i.e.*, myopia) more constant in the higher than in the lower social classes.] **F. Kramer** and **G. Moskiewicz.** 'Beiträge zur Lehre von den Lage- und Bewegungsempfindungen.' [(1) *Experiments on the position of the hand.* The effect of practice is very great; a point that is freely chosen can be found more exactly than a prescribed point; interference with muscular tension has no appreciable

influence on the accuracy of result; on the other hand, accuracy is seriously affected by the position of the point in regard to the body. Symmetrical placing of the hands is possible only within a region of easiest positions. (2) *Experiments on movement.* (*a*) Arm movements of different length show (average error and right and wrong cases) a constancy of the relative difference linien, varying in the individuals tested between the limits (approximately) one-tenth and one-twentieth. (*b*) Influence of position and direction of the extent to be reproduced upon the accuracy of reproduction. Repetition and variation of Loeb's experiments; confirmation and generalisation of their results. "That extent of movement is the shorter, which in the judgment of all the observers is the less easy or comfortable." The judgment of equality of distance depends upon the equality of impulse given (not in the sense of innervation sensation, but in that of "the idea of the necessary expenditure of energy which precedes any given movement") and of time elapsed; in the case of successive movements it depends further upon preadjustment of attention.] Literaturbericht. Bd. xxv., Heft 3. **Th. Lipps.** 'Psychische Vorgänge und psychische Causalität.' [An elaborate and closely reasoned paper, the burden of which is that psychical causality can be predicated, not of conscious contents, but only of the unconscious 'psychical processes'. "The conscious contents that constitute the life of consciousness are: sense-contents and feelings; . . . the ideational contents corresponding to them; the modes of temporal and spatial existence, temporal and spatial relations, forms, etc., perceived or ideated; and the directly experienced relations of the objective conscious contents to the ego, or *vice versâ*: nothing more. On the other hand, the unconscious factors that constitute the causal psychical life-complex are the sense-processes and idea-processes; the real temporal and factual relations of these to one another; the modes of their interconnexion, or associations; and lastly the psyche itself, with its general states and inherent memory-dispositions. No one of the elements of the life of consciousness enters as a factor into this causal interconnexion; and no one of these factors of the psychical causal interconnexion can ever pass over into the life of consciousness. The psychology which transcends description and proceeds to explanation constructs a real psychical life-complex out of these real factors. In doing this it makes the conscious life . . . causally intelligible, in the only possible sense of this phrase. That is the task of psychology as explanatory science."

The paper begins (1) with a reference to hallucinations, which show the necessity of 'supplementing' in psychology, of a passage beyond the phenomenal to the real. Such supplementing is given with the idea of mind or brain, as organised or endowed thus and thus, and furnished with memory traces; and also with the mention of physiological stimuli. But more is wanted. (2) Physiological materialism gets its causal connexion by way of brain processes: but these are physical, and the vehicle of psychical causation must be psychical. We therefore substitute 'psychical processes' (real and unconscious) for the physical. "The psychical life-complex is an interconnexion of the psychical processes, and only indirectly of conscious contents. . . . It is an interconnexion of the real; and this is the same thing as saying, of the unconscious." (3) But we need not appeal to physiology. The theory that conscious process proceeds from conscious process is untenable: every physiological stimulus, every effect of a disposition or a memory-trace overthrows it. Conscious processes can never be more than ideal, phenomenal, existent-in-consciousness; they cannot therefore have real predicates. On the other hand, the psychical life-complex, which is

subject-matter for psychology, is real, existing whether I am conscious of it or not. (4) Let us now take the real and the phenomenal together. The latter shows interconnexion and mutual conditioning. The physicist derives from it, for his real, spatial and temporal connexions; the psychologist, for his real, temporal connexions only. Both reals are, further, causally interconnected. Causality is at first nothing but a real uniformity; but we later read into it the mutual conditioning of the phenomenal. (5) Here we have the difference between the reals of the physicist and the psychologist: neither regards all conscious contents as mere signs or symbols, but the psychologist (taking over time alone) does this in greater degree than the physicist. (6) This section is devoted to a more detailed consideration of the psychical (unconscious) processes. "We give this name to the processes making towards the existence of sense-contents and their corresponding idea-contents which (and so far as they) join together to form an unitary psychical life-complex, *i.e.*, stand throughout in direct functional relation to one another or with all processes of like kind." This unity of the psychical life-complex is termed attention. (7) The instance of the ticking of a clock, which I do not hear while working, but hear as soon as my attention relaxes, leads to the distinction of a 'psychical' and a 'conscious limen'. (8) This case might be explained by appeal to grades of conscious clearness: not so the case that I remember not to have heard the ticking. Even the simile of the conscious field of vision can be pressed into our service: for the field, with its conscious point of regard, is only a portion of the sum-total of conscious possibilities at the moment: there are countless psychical processes, making towards conscious contents, which do not call any conscious content into existence because they do not strike our mental eye. But 'degrees' of consciousness are, in any case, unthinkable; nor is there any such thing as a 'becoming' conscious. (9) This section appeals to further facts: an idea calls up a particular idea out of the many associated to it; the first part of a name is given, and I complete it; reaction-time is affected by practice and fatigue; I analyse a clang into its partials; I find a star, in a cluster, that I pass over if it shines alone, etc. All these cases must be explained in terms of the psychical processes, not of the relative clearness of conscious contents. (10) The same thing is true of associations, experiential and by similarity; and, indeed, of every consciousness of likeness of kind, similarity, identity: psychical causality belongs only to the unconscious psychical processes.]

Literaturbericht.

Philosophische Studien. Bd. xvi., Heft 4. **W. Wirth.** 'Der Fechner-Helmholtz'sche Satz über bagative Nachbilder und seine Analogien.'—I. [Helmholtz lays it down that the intensity of the sensation aroused over a fatigued area of the retina is a function of the intensity of the reacting light. "Fatigue of the *Sehnervsubstanz* affects the sensation aroused by new incident light in approximately the same ratio as if the objective intensity of the light had been decreased by a determinate fraction of its magnitude." The author shows the relation of this proposition to Fechner's parallel law, and names it the 'Fechner-Helmholtz law'. The object of the paper is to test its validity by quantitative measurement. Quantitative work on the negative after-image: *cf.* Müller, Fechner and Helmholtz; Schoen; von Kries; Martius. Critique of Martius' method and hypothesis. New experiments: colourless after-images (pigments) from the Marbe colour-mixer. "Over a wide middle zone, the value of the after-image stands in an approximately constant relation to the absolute brightness of the reacting surface," *i.e.*, the Fechner-Helmholtz law is valid. Episkotister experiments: the change-

of illumination over the whole field of vision and the settings for subjective equality are effected at one and the same time by variation of the Marbe apparatus; observation of the disappearance of the after-image effect; comparison of a coloured after-image with the after-image of a corresponding brightness-difference. General confirmation of the law.] **F. Krueger.** 'Beobachtungen an Zweiklängen.'—II. [Intervals from octave to twelfth, and from twelfth to double octave. Introspective results: the process of analysis; the estimation of partial tones (temporal, qualitative, intensive); the apprehension of beats; optical and other associations; the affective impression. Objective result: "from the connexion of two simple tones there result, over and above the summation-tone, as many as five difference-tones of various orders, whose pitch is to be calculated by subtracting the one from the other, first, the pitch-numbers of the primaries, and then, in order, the two smallest vibration-numbers already obtained. These difference-tones bear precisely the same relation to one another and to the primaries that the primaries bear to each other; this is shown, *e.g.*, in the matter of mutual intensification, when several of them coincide or lie near together, and in the matter of the beats and intermediate tones which arise in this second case."]

PHILOSOPHISCHES JAHRBUCH. Band xiii., Heft 4. **C. Gutberlet.** 'Teleologie und Causalität.' [This is the first of two articles, in which the writer, pointing out that the discovery of any plan of evolution implies not only our intelligence that discovers it, but another intelligence by which it has been made, proceeds to attack the theory that teleology is mere causality reversed. This would be too general a view of teleology. The necessary dependence of *a* on *b*, and of *b* on *c*, does not by itself give us *b* as a means whereby *c* produces *b*. *An eye evolved, sight results*, does not imply that *sight was intended by the evolution of the eye*.] **J. Baur.** 'Die actuell unendliche zahl in der Philosophie und in der Natur.' [The writer continues, against the majority of Scholastics, to maintain the actuality of an infinite number, both as a philosophical possibility and as existing in nature. After answering a series of objections, he affirms infinite time, and the infinite of space, and, firstly, the infinitely small. There are no direct, but many indirect proofs of this.] **E. Rolfes.** 'Neue Untersuchung über die platonischen Ideen.' [The writer analyses various works of Plato in order to prove, not only that his "Ideas" are self-subsisting, but that their subsistence is, according to Plato, one with the existence of God, not independent of Him. Stallbaum's argument to the contrary contradicts his own standpoint, and he himself says that Plato's Ideas are the thoughts of God.]

VIII.—NOTES.

HUMAN SENTIMENT WITH REGARD TO A FUTURE LIFE.

The American Branch of the Society for Psychical Research has recently issued an interesting *questionnaire* (part of which is printed below) to determine the feelings with which the possibility of a future life is actually regarded by educated adults at the present day. From the Society's point of view the question is of course one of primary importance, inasmuch as the emotional bias enveloping the subject must form a (hitherto incalculably) distorting and thwarting influence in most of the Society's investigations. And experience has convinced some at least of the authorities of the Society (the English branch has not yet officially taken up the inquiry) that while there is no exact knowledge as to the various forms of human bias, there is grave reason to doubt whether it is actually such as is commonly supposed.

But though the inquiry has in this way been suggested by a practical need, it is, of course, in itself scientific in character, and as such should appeal strongly to all students of human psychology. And it may be added that it seems well designed to throw light also upon many philosophic questions whose interest is not solely psychological.

For instance it should afford a definite test of the at present much discussed doctrine of the existence of a 'will to believe' (and to *disbelieve*), as accounting for the beliefs actually held. The answer to question II. should also throw much light on the ethical questions as to the value of life.

Indeed it may already be affirmed that many interesting, valuable and somewhat surprising answers have been obtained. Of course, however, to make the results thoroughly representative and trustworthy, a very large number of answers must be collected.

Hence it is hoped that psychologists and philosophers generally will consent to assist in collecting answers. Copies of the *questionnaire* may be obtained on application to Dr. Hodgson or myself, and *European answers should be returned to me* (at Corpus Christi College, Oxford), *American to Dr. Hodgson* (at 5 Boylston Place, Boston, Mass.).

F. C. S. Schiller.

N.B.—*All names will be regarded as strictly confidential.*

Questions.

I. Would you prefer (*a*) to live after 'death' or (*b*) not?

II. (*a*) If I. (*a*), do you desire a future life whatever the conditions might be?

(*b*) If not, what would have to be its character to make the prospect seem tolerable? Would you, *e.g.*, be content with a life more or less like your present life?

(*c*) Can you say what elements in life (if any) are felt by you to call for its perpetuity?

III. Can you state *why* you feel in this way, as regards questions I. and II.?

IV. Do you NOW feel the question of a future life to be of urgent importance to your mental comfort?

V. Have your feelings on questions I., II. and IV. undergone change? If so, when and in what ways?

VI. (*a*) Would you like to *know for certain* about the future life, or (*b*) would you prefer to leave it a *matter of faith?*

The name, sex, age, nationality and profession of those who answer are asked for.

REPLY TO MR. HERBERT SPENCER'S NOTE IN "MIND," JANUARY, 1901.

In the January number of MIND, under heading "Notes and Correspondence" (p. 144), is a contribution by Mr. Herbert Spencer, commenting on my paper which appeared in that journal for October, 1900.

It appears that Mr. Spencer considers that I have incorrectly represented him "as regarding our consciousness of Space as evolved from our consciousness of forces".

Whereas, actually, the idea of Space [Void] is derived from the occasional consciousness of the absence of resistance [or absence of force], as *contrasted with* our consciousness of force or of resistance, which (latter) is synonymous with our consciousness of Matter.

This statement of the case (as I would word it) substantially accords with the teaching contained in the *First Principles*, as I interpret it. Therefore there could have been no intention in my paper to contravene the *First Principles* in relation to this point.

Indeed, in my October paper, which Mr. Spencer criticises, it is expressly stated: "There is no means of applying forces to Space" (p. 524 of MIND for October). And I suggested that it might be expedient on this account, not to class Space in the same category as Matter or material objects, as some do, it seems.

My critique related to a "*particular theory*" of Space suggested by Mr. Spencer in his *Principles of Psychology*, vol. i. It will be best to re-quote the passage in my paper Mr. Spencer demurs to, and which he himself cites. The passage is as follows:—

"In his *Principles of Psychology* . . . Mr. Herbert Spencer ventures to suggest a particular theory, which makes space and time the resultants of a particular transformation passed through, where force is therefore (by implication) concerned, just as if it were a case of colour or sound. . . . If Space and Time be not resultants of force-action, may not this constitute some reason for regarding them as absolutes?" [quoted by Mr. Spencer in MIND for January].

Mr. Spencer says he is "amazed by these statements". But I think it may be made evident that the critical remarks I ventured were justified, if this be not already clear to some from the original wording of my paper.

For what does this theory of Space in the *Principles of Psychology* involve? Mr. Spencer's own words are:—

"There is some ontological order whence arises the phenomenal order we know as Space" (*Principles of Psychology*, third edition, vol i., p. 227).

In definite language, this can evidently only mean that something unknown (an "ontological order," or absolute existence) acts—acts therefore by force[1]—on our consciousness, "whence arises the phenomenal order we know as Space". Without force, there obviously can be no action or consciousness, involving change. Force, in fact, has been well characterised as that cause which produces change.

A "phenomenal order" or phenomenon [which we call "Space"] is then substantially held by Mr. Spencer to "arise" as a resultant derived from the interaction between some unknown absolute existence, and the force of our consciousness. Space is then here considered to be a transfigured result, evolved out of some unknown absolute.

But if so, my critique must be rationally justified; which represents Mr. Spencer in this *particular theory*—"as regarding our consciousness of Space as evolved from our consciousness of forces".

For of what here are we conscious, according to Mr. Spencer? Every cause which acts on consciousness in such a way as to produce a decided effect of change as a result [called here a "phenomenal order" by Mr. Spencer], may, it is evident, be classed as a "force". Here some force due to an "ontological order" or absolute existence (as a cause) acts on our consciousness [according to Mr. Spencer] and generates "the phenomenal order we know as Space"—as an effect or resultant. Is not this effectively to say that our consciousness of Space is "*evolved from our consciousness of forces*"? Yet Mr. Spencer demurs to the passage in my paper of October, 1900 (in MIND), which gives this interpretation to his words in the *Principles of Psychology*. I fail therefore to see the justification for Mr. Spencer's singling out this particular point in my paper for criticism in MIND; while he passes over without any comment other reasoned-out conclusions in the same paper.

Mr. Spencer's Note was welcome, however, for divers reasons, not excluding the one that truth tends to establish itself (it is said) by criticism.

S. TOLVER PRESTON.

[1] Or which acts by the *absolute* correlative of the force we know (which implies the same thing). Or—to quote Mr. Spencer's words—"We are irresistibly compelled by the relativity of our thought to vaguely conceive some unknown force [in the absolute, Mr. Spencer means] as the correlative of the known force" [in the relative] (*First Principles*, p. 170).

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MIND

A QUARTERLY REVIEW

OF

PSYCHOLOGY AND PHILOSOPHY.

I.—SOME REMARKS ON CONATION.

By F. H. Bradley.

In the following paper I intend to remark on certain aspects of conation. I hope to supplement it with others which will discuss some further questions about volition and desire. But I cannot even in the end attempt to treat these subjects completely, and in these pages especially my object is very limited. I find myself with a view more or less definite about desire and conation, a view which in the main I accepted long ago, and which I have seen no good reason to abandon. I find on the other hand certain doctrines taught by some writers whom I sincerely respect, doctrines which at least appear to be incompatible with that view which I have adopted. And I am confident that none of us has ideas so absurd that, when understood, they should have no truth. Hence I am going to set down about conation some things which to myself appear to be true, in the hope that some one will explain how and why to him they are not true, or how being true there is perhaps no one who in the end holds views in collision with them.

The main contention of this paper is that conation is something which we experience, that it is complex and has in itself some inseparable aspects which therefore are experienced, that apart from these experienced aspects conation has lost its true meaning, and that the use of it in another meaning, if not illegitimate, is in psychology at least dangerous.

Certainly I do not deny that there is experience below the level of conation proper. And I do not deny that this experience has features which survive at a higher level though in part more or less transformed there, and that these features go to constitute that which we call conation. An inquiry into the nature and limits of such a lower experience would in its own place be important and even necessary, but it falls beyond the narrow scope of this article. We are to ask here about the minimum which can be taken to be contained in conation proper. How much of that minimum can exist, and under what precise form it exists, where conation is not reached, is a question which cannot be considered here. On the one hand, to repeat, I should agree that below conation there are certain aspects or elements which we also find in conation proper. On the other hand I must not be taken to admit that any one of the aspects of conation exists outside of it exactly as it exists within it. And I fear that with due regard for the limited purpose of this paper I could make no attempt to be more explicit.

Confining ourselves then to conation where it exists at its proper level, we discover there in every case some inseparable characters. These essential features are the aspect of a "not-myself" and of a "myself" hindered by this, together with an idea of a change containing the removal of the hindrance, an idea with which the "myself" feels itself one. And all these aspects must be experienced at once if conation is to exist. The appeal is of course made to the experience of the reader, and it would, I think, be useless to attempt a long exposition.

The first question is whether we can experience conation at all. I am not concerned here to define conation accurately and to ask whether for example we could properly apply the term to all desire. But taking conation here as a general head under which fall desire, striving and impulse, our question would seem to admit of but one answer. When I strive or desire I certainly can feel and be aware more or less distinctly that I am striving or desiring. This seems plain, and no one, I believe, could deny it except perhaps in the interest of some theory, nor indeed do I see how to make it plainer. Whether we may ever use conation as the name of some state of which I am not at all aware as conation, is of course another point to which I shall return. But for the present I shall assume that conation can be experienced as such, and it is about this conation of which we are aware that I am at present to speak. When we experience this, what is it that we feel and experience?

When I am conscious of striving there is an existence, a "not-myself," to be altered, and I find that I am aware of this existence. The point is to me so clear that I cannot try to make it clearer. But the objection may come that what I strive to change may at times be my own self, and therefore that this existence cannot properly be called a not-self. I however reply that whatever is felt as an existence opposed to the self is for this purpose a not-self, and that in conation such an opposition is always experienced. And, as I shall come back to this point, I will at present deal with it no further. But in conation I am not only aware of a not-self but I am aware of it also as something to be changed. In conation I therefore must possess and use an idea of the change. I have in other words an end, however vague, and I have it also in my knowledge, and, if so, I must have an idea of a "to be," and without this idea there is no conation. This second point once again seems to me almost too clear for exposition, but it is necessary here to guard against two fatal misunderstandings.

(i.) It will be objected first that we may have conation, and may even experience conation, without any idea of an end. There are impulses (it will be said) instinctive and acquired which are indeed directed on an object and directed to an end, and yet in these no idea of the end need be present to the mind. And there are again the facts of felt need and dim desire where want and impulse are experienced, but where we certainly do not know the goal in which we seek satisfaction. Now (it will be urged) there may fairly be a difference of opinion here as to what and how much we in each case experience, but in some of these cases at least it is clear that we have no idea of an end, and on the other hand it is equally clear that conation is present. And the existence of blind conation, it will thus be said, cannot possibly be denied. But in answer to this objection I must insist that if there is a conation it is not wholly blind, and that where we have real blindness we have something which is not really a conation. In some of these alleged blind states there in fact is certainly a vague and ill-defined idea, a point which I shall soon attempt to explain, while in others on the other hand I agree that no idea of an end is present in fact. In the feeling of want, for example, I may be aware of pain and uneasiness and of restless movement, and yet in some cases at least there may be no idea of what would satisfy, and therefore, I should add, certainly no conation at all and no appetite proper. And of course in some "impulses" I should agree that the subject is impelled to

be active, and that the activity is directed to a certain end, and I should agree also that while active he may have no idea at all of this end. But then I should deny that such "impulses" are cases of conation, for I should insist that in these no conation is experienced. Something is experienced there, I should say, which also enters into and is experienced in conation proper.[1] What is present there is certain aspects of conation proper, and these aspects, given another element, really are transformed into and become an actual conation, and they normally in fact are developed into it. And so *you* standing outside transfer covertly this wanting element from your own experience to the mind of the other subject. Hence through confusion you call the fact by a name which belongs to the complete state, a state which in fact and actually is not being experienced by this subject at all. Or else, perhaps, you knowingly for the sake of convenience apply the term in a mutilated sense. In either case I consider your procedure indefensible, and the issue, it seems to me, may be raised in the following way. Take an instance of conation where the idea of a "to be" is present, then take another state of mind without any such idea, or, to avoid objection, let us say another state of mind so far as it is without the idea.[2] Be sure that the idea has been removed wholly and utterly and is not covertly supplied. Then see whether in passing from one of these experiences to the other you do not feel an essential difference between them. If you do not find this difference I confess that I cannot proceed, though I am unable to believe that you have properly performed the operation. But, if you find it, I urge that this difference is essential to conation, and that where it is wanting conation is not present. For the conation of which I am now speaking is, I would remind the reader, experienced conation. And if you reply that this essential difference is not essential to conation, I ask for the name of that state to which really it is essential. So far as I see you give no name to what I call conation, a state which, as we have now recognised, essentially differs from what you call by that name. We will not argue about names, and I will leave you to find that which you think suitable. And then

[1] I would once more here remind the reader that I cannot in this article attempt to explain how much of conation in the proper sense can exist outside conation. My object here is merely to insist on certain features without which there is really no conation.

[2] I am not attempting in this article to show where conation is and is not experienced as such. I will only say here that there are assertions about the omnipresence of this experience which I am quite unable to reconcile with fact. Cp. MIND, 49, p. 15.

I should repeat, conation involves the idea of an end, and without this there is no conation at all in the sense of experienced conation. And whatever name you substitute for conation my contention will remain unaffected. It will be simply a question of writing one word for the other and of employing probably a bad name instead of a good one. Only I must insist that you do not pass tacitly in future, wherever it pleases you, from one meaning to the other.

(ii.) "But," it may be said, "there remains a difficulty about the *idea*. If we admit that conation cannot be experienced without an awareness of something 'to be,' yet in many cases where really this genuine feeling exists you cannot show an idea. We may for instance have a perceived thing and a desire for that thing, and may yet have no image at all." This objection, however, would rest on a common prejudice about the nature of ideas.[1] It is believed that, in order to have something ideal which qualifies an object, we must have an image or images existing separate or at least separable from that object. I say nothing here about the further possible question as to the alleged necessity for words, except to dismiss it as here certainly not worth discussing. But this identification of the ideal with images is surely a mistake. If, to have ideas, we had to wait till we possessed such images, assuredly, I should say, we never should get any ideas or could ever begin to think at all. And this is a point to be insisted on everywhere and generally and not specially with regard to desire and conation. The first form of the ideal is a sensible existence modified in its content so as to be incompatible with itself as merely perceived. In intellectual perception a suggested modification of this kind is usually accepted by the perceived object, and the object is thus altered accordingly and so ceases in its old form to exist. There is hence no awareness here of anything ideal at all. But under other circumstances, and always we may say in desire,[2] the case is altered. The perceived existence there is qualified in a way incompatible with itself, and yet it cannot simply accept this new qualification and so

[1] I am here taking no account of those who, while more or less assenting to the substance of what is urged in the text, would nevertheless wish to confine the use of the word 'idea'. This is a difference merely with regard to terminology. It seems to me all-important to extend the application of the term 'idea' and to keep any restricted use under the general head. I am, however, far from denying the value of distinction here.

[2] If our wants could be satisfied at once as they arose, should we know what appetite means? I do not discuss this question, but I think it turns on what we mean by "at once".

cease to exist as at first perceived. On the contrary it persists as before, and yet is modified also in an incompatible manner. And in the awareness of this qualification of the perceived fact, a qualification discordant with the perceived fact, we gain our first experience of the nature of an idea. An obvious instance is a perceived fruit which I cannot reach, while yet I feel it, as we say, in my hands or in my mouth. The fruit itself is qualified here at once actually and ideally. The ideal qualification does not or need not consist in separated images, and yet it is an idea and is the end which is desired by me. If I may be allowed to quote a passage from a former article, we have here a "state where the presented is qualified ideally so as to collide with itself, and where this discrepant content is desired without being a separate image. A common instance of this would be desire for (the continuance of) a feeling which exists. And it was when sensation had been overpowered by its idealised self, that desire, as we saw, almost ceased before the moment of possession. This again is how we can have a desire without knowledge, a dim desire with no clear object, as in the usual example of the sexual impulse. It is not that we have *no* idea, for, if so, our state would be something lower than desire. But the idea is a common element, a something in a number of psychical states, which pleases and is not in harmony with these states as they are, and its increase is felt to lead us beyond, we know not where. We desire the presented, but we desire it with an ideal qualification. We need have no image, and yet even here we want to realise an idea."[1]

It is by this principle that we can distinguish between appetite and the mere feeling of need or want. In the last phrase I must be permitted once more to remark on the fatal ambiguity of the word "of".[2] If the need or want is felt as such, we certainly possess an idea, however vague and general, of that which we want, an idea which, we have seen, need not be separated from the object as perceived. With such an idea we have, normally, also appetite. But without that idea we have but more or less localised feelings of discomfort and restlessness, and these sensations are not

[1] MIND, No. 49, p. 23. I would refer the reader further to the context of this passage, and again to my *Appearance*, p. 606. It is possible to object to the presence everywhere of an idea in conation and will on the ground that, if this were so, we could not will to have an idea without already possessing it. But the objection is met by insisting in these cases on the genuine presence of an idea of the idea. I have referred to this point on p. 24 of the above article, and had previously discussed it in MIND, No. 43, p. 313.

[2] Cp. MIND, No. 43, p. 319.

feelings *of* want except for a further knowledge and recognition existing in an outside mind or coming to our own by later reflexion.

We have seen that in conation we experience a not-myself together with an idea of its alteration, and I will now proceed to point out a further aspect of our experience. In conation and desire I feel that *I* am desiring and striving, that I am being hindered by the not-myself, that I am something and yet that I am not what I would be. In brief in conation the self is experienced as itself qualified by the idea of the altered object. It is thus felt to be in collision with the object as not-altered, and without this experienced aspect there is once more no conation at all. The appeal is again to the observation of the reader, and nothing, I think, would be gained by a lengthy attempt at exposition. I will, however, try to remove some misunderstandings.

How, it may be asked, can this hindered self be experienced unless it is experienced as something concrete, and how can it be anything concrete when, as we saw, the self can even oppose itself in desire to its self? Where the self is experienced as a concrete hindrance, how can we also there have a concrete experience of the self as hindered? But the self, I reply, never can make an object of its whole self at once. It can at any one time so attend only to certain elements of its content. These are distinguished from it and so being distinguished make a not-self, but the whole of feeling from which they are distinguished remains and still is felt. This whole is concrete, and only because this concrete substance is actually experienced is it possible ever to experience a self or a not-self at all. I at least do not know what is meant by the experience of an object or a not-self, unless the self is also at the same time experienced inseparably with it.[1] And I do not know what is meant by such an experience of the self, unless that self is something concrete and is so actually experienced. The same remark applies to our state when we merely perceive an object as given to us. Unless the "us," the self, is here experienced as a concrete content, I cannot myself imagine how we are to go about to feel it as passive. And with regard to conation and desire the case seems to stand as follows. We have before us a not-self which is an object, and we have before us an idea of a "to be" which again is an object. We experience further

[1] I do not mean that the self must be experienced at the same level, that, *e.g.*, as against a perception the self must be perceived. This would be a very serious error.

our self in collision with the not-self, but that self, though experienced, is (so far as the conation goes) not before us and it is not an object, except so far as, and to that extent up to which it enters into the content of the idea of the "to be".[1] On the other hand, our self must be felt as a whole and felt also as one with the idea of the 'to be'. And, if the self is not so felt, there is at once an end of what we experience as conation. And I would appeal on this point to the judgment of the reader who has no theory to save.

"But," it may be further objected, "my self is something which goes beyond the moment. It is the unity of my life, and how can this be felt as the mere content of one experience? It is more than one single experience and therefore it cannot really be felt within one." But it seems possible, I reply, so to feel it when a man stakes here and now his entire being on the accomplishment of some end. And the whole objection seems in fact to rest on a misunderstanding. Certainly it is desirable to ask about the real nature of that self which goes beyond the moment, and to inquire how far and in what sense it is identical with, and is felt to be identical with that which at one time is experienced. But this task, necessary in its own place, is here not necessary, and, however important these questions are, I may pass them by. For my contention was that in conation the self in fact is experienced against a not-self, and by urging that the self is more than this experience and goes beyond it, you obviously do not disprove that contention. You do not disprove it unless you are prepared to insist that, because the self is more, it must therefore be less and in fact does not enter into my experience at all. On a doctrine of this kind I shall lower down have something to say, but at present I will meet it by an appeal to fact. I find my self in fact so experienced, and, if upon any theory that cannot happen, so much the worse for the theory.

"But," I may further be asked, "may we not have an outbreak from some tendency in the subject or self, and may not this outbreak produce a characteristic experience? May it not be directed to a certain end, and yet, as experienced, not contain the element of a hindered self?" Yes, I should reply, in the main I agree that this contention is sound. But

[1] Usually, and, perhaps it might be contended, even normally, the self to some extent does thus enter in. I have an idea of myself for instance as already touching or eating the fruit which I desire. The more prevalent doctrine, I believe, is that in desire this *must* always be the case. I am not, however, able to accept this view as correct (see MIND, No. 13, p. 21). I hope in a future article on volition to return to this matter.

on the other hand I must urge that it is irrelevant and a mere return to the confusion which I have already pointed out. Such an experience is not a conation for the self which feels it. It is not experiencced as a conation, and therefore it is not properly a conation at all. For, I would repeat, it is conation as experienced which at present is in question.

We have seen that in conation or desire we have the aspects of not-self and self and an idea of a "to be". I wish now to insist that all these aspects must be experienced together and must be felt as one whole, and that, failing this, the experience of conation is destroyed. I have not to ask here if any felt state can precede and can be experienced without any consciousness of a not-self or self, nor have I to ask whether the practical attitude is prior to the theoretical attitude, if indeed either is prior. Such questions, however important, may here be disregarded. I am urging that as soon as conation is experienced, whenever that is, it must contain certain features and must also be felt as one whole. Now 'feeling' I use for experience, or if you will for knowledge, so far as that experience or knowledge does not imply an object, and I should myself give as a very obvious instance a simple pain or pleasure, or again those elements of our Cœnesthesia to which we do not attend. I am myself averse to the use of the term "knowledge"[1] here, because that term naturally tends to imply that there is an object before me and a distinction experienced between the knower and the

[1] A difficulty is caused here by the ambiguity of the term "knowledge". This is used on the one hand as equivalent to "experience" or at least to "familiarity" in the widest sense of these terms, and on the other hand it is restricted to a theoretic state and to what may be called the cognition of an object. I cannot of course ask here in what cognition consists, and whether beside an object it does not also involve an idea and judgment. But, passing this by, we may say that knowledge is used either in a very broad sense for experience or in a narrower sense as limited to knowledge *of* or *about* an object. And hence on the one hand it sounds absurd to say that we do not know pleasure and pain or conation, and it sounds absurd again to speak of these states as being states of knowledge. The fact is that we naturally pass from the state in which we merely, for instance, feel a pleasure or pain to the state in which we feel it and also make it an object. The view that we cannot make an object of a pleasure or pain, I may remark in passing, is to my mind quite indefensible. Hence because I can and do make these things into objects (as indeed I am able to do in the end with everything), and because there is a natural tendency to confuse our state when we do this with our state when we merely feel, it sounds absurd to deny knowledge in the case of an experience of pleasure or pain. But, when we speak strictly, I think it is better to deny, and, when we realise what we mean, the absurdity disappears.

known. But within feeling there is no such distinction between the experience and the experienced or between the known and the knowing. If it is knowledge, it is that form of knowledge which does not contain a not-self as opposed to the self.

But everything that in any sense whatever we know or experience must, so far as it enters into our experience, be felt as ours. The most abstract thought, for instance, of the most remote thing must also and as well, while I have it, be an element in my felt self. The thing is not a *mere* feeling of course, and, so far as you regard its content as referred to a subject, so far, that is, as it is thought of and is taken as a thing, it is so far not a feeling at all. For you have got it now as abstracted from that immediate whole into which, taken otherwise, it enters and enters as a mere feature. And an experience or knowledge of any kind which is not thus felt as now and mine, is in my opinion a mere illusion. Everything, we may put it so, that in any way whatever comes within our experience is a feeling, though in our experience there are some things which also and at the same time in certain aspects are more than felt, and, if taken merely so, are not felt. Thus in conation the not-self which is an object is also felt as an element of my whole state, and the idea of the "to be," which is an object, is once more felt as another element there. And the self, to which the not-self is opposed and which finds itself at one with the idea, is both felt as mine in the same sense in which the object is mine, and it is felt as mine again in a further and a higher sense.[1] These several aspects are all

[1] I do not discuss this last point here. It will be taken up in other articles. It is a matter which in one sense I agree is inexplicable, but at the same time I may hope to convey to the reader my meaning with regard to it. This may be done, perhaps, briefly in the following way. We find in conation both the theoretical and the practical relation of self to an object. And for the purpose of this article we may take these relations as existing and as really inseparable, and we need raise no question either as to any priority between them or as to anything that may have preceded one or both. But while taking them here as really inseparable, let us by an abstraction separate and consider first the theoretical relation by itself. In this experience there is an object for me, let us say a fruit. This object is in the first place (*a*) felt as mine, as an element, that is, in my whole felt state, and it is also in the second place (*b*) felt as something other than myself. And my self so far, it will be understood, is not an object at all. Let us now, however, add and restore to our abstraction the practical relation and let us note the difference. There will be here also an idea, let us say of eating the fruit. This idea is itself an object beside and against the first object, or more correctly, perhaps, we may be said to have a new complex object containing both. Now the idea, being an object, is like the first object felt (*a*) as an element in my whole

felt, and they are each not felt as separate but together in connexion with one another as integral features in one whole. This whole is "known" and is experienced, though as a whole it is not an object. We may of course go on to make it an object, but, so far as we do this, we have induced a new state of mind. We have got now a new felt whole with an added element, but we have still a whole in which everything on the one hand is felt as mine, and where on the other hand the feeling of my self is not and cannot be an object.[1]

We have seen that conation is experienced and has a complex content, and we have noticed the elements of that complex. We have further seen that conation must be felt as one, as a single whole with certain aspects, all of which must be experienced if conation proper is to exist. And I would recommend this result not as a theory but as a fact to be observed by the reader, and I am even confident that, if the reader will observe disinterestedly the thing for himself, he will find it to be very much as I have described it. He may consider that what I have set down has been more or less mal-observed and mis-interpreted, but I think that in the main perhaps he will agree about the facts, if, that is, he does not come to the work with a theory to save. And since the result which I have stated is on the whole not mine and is far from being novel, it seems to me strange that some psychologists should treat this result, altogether or in part, as being something unknown or non-existent. And yet the outcome of a failure to notice such an apparent fact as we have described, and the outcome of a further insistence

state, and (*b*) again, like the first object, it is felt as a something not myself. But the idea is also (*c*) as against the first object felt as mine and one with me. My self feels that this idea (which, so far as it is an object, is an other) is in its opposition to the first object not an other to myself. On the contrary, the idea is felt as the expression of my self against the first object, which is now in two senses something alien to me. If the reader will consider this brief statement with attention, he will I hope realise the meaning of that special sense in which in conation the idea is felt as one with myself. I will add that even in the practical relation I do not myself consider that the self necessarily enters into the content of the idea and so becomes an object to itself. This is, however, a point to be discussed in a future article.

[1] So far as the conation remains a conation, it still must be felt as such. So far as it is made a mere object it is not a conation, and the making it an object may under some conditions destroy it. To make an object of a conation may even be said, if this is taken in the abstract, to tend to destroy it. But, the conditions being complex, the result will of course always vary with them, and the general effect may be to intensify the conation. I cannot, however, discuss this subject here.

perhaps on the part of some that the self itself is not experienced at all, and itself does not enter as an element into the content of the known—seems not satisfactory. Any such doctrine seems not only in itself contrary to fact, but in its working also it appears to break down. For in the end no one, even to save a theory, can deny the fact of self-consciousness. Somehow the self as a reality or as an appearance is known, and in the end somehow the self, whether truly or falsely, does get into our experience and knowledge. But how, if it does not itself enter into the experienced, the self could ever be known, or ever in any way could be thought of or imagined, remains an insoluble problem. We have here a question that may be asked or may be ignored but will never, I think, be answered intelligibly.[1]

We have seen that conation, if experienced, must possess certain aspects, and that apart from these it is not experienced conation. And taking this as shown I will go on to deal shortly with a further point. Why, it may be asked, even if conation is not in fact experienced except as you contend, should we not for some purposes employ the term when taken otherwise? Now if this question is asked with respect to metaphysics I wish to say nothing here. And if the question were asked with regard to some branch of natural science I should not venture to say anything, because all that I could say would be that whatever ideas, however fictitious, best work there I believe to be best and right. But if the same question is raised about psychology I may answer briefly as follows. If you take a term like conation which stands for an experienced fact, and apply it to something else which is not so experienced, you clearly so far are making use of a fiction.[2] And about this fiction we must ask a twofold question which is vital. Is it in itself a good way in which to explain some psychical facts, and does it when so used entail mischievous consequences? Now I would not deny that this fiction can serve as a legitimate way of explanation, though when it is taken on the whole I venture to think that it does not work successfully. But on the other hand its use seems open in-

[1] In much of the above I am once more urging what I had to urge long ago in my *Ethical Studies*. I have always, I hope, been at bottom faithful to that cardinal truth which I was so fortunate as to learn early —the truth that what matters is the self that is experienced, and that there is nothing else whatever which matters. Between a self outside the experienced and no self at all there is in the end really no difference.

[2] I am not objecting to the general employment of fictions in psychology. On the contrary I think them necessary, and justifiable so far as they are useful and not injurious.

cidentally to a very serious objection. For psychology surely has to observe and to study psychical facts, and among these facts, we have now agreed, is conation in its genuine form as something experienced. If therefore in psychology you will insist on employing conation in another form also, you will have two meanings of conation which you will be bound throughout and everywhere to keep in mind and to distinguish. Your working fiction must not be allowed to distract you from the attentive study of the genuine fact, and the full nature of the genuine fact, when you apply your fiction, must be kept resolutely out of view. This has to be done within one and the same study and any failure is liable to make mischief. Now if you can yourself perform this feat you must be different I think to the majority of psychologists,[1] and further, if you did yourself perform this feat, it is almost certain that your readers would not follow you. If then we admit that the feat, if actually performed, may in some ways be useful, on the other hand the attempt to perform it on the part of your readers and yourself would probably result in more or less of confusion. And in this confusion the genuine fact to be observed would tend to become lost to view. But in any case I would end this paper with the appeal which it has been its main purpose to urge. Let us at least begin with an attempt to observe in its entirety the experienced fact of conation. Let us endeavour to find out what it contains, and, if that is complex, let us seek to analyse it and to set out its aspects; and, if in the fact there is nothing complex, let us try at least to point to the fact and to distinguish it more or less intelligibly from other facts or elements or aspects of fact. And if what I have contended for here with regard to

[1] I find it hard to believe that a writer clear as Dr. Stout usually is, distinguishes always between an experienced conation and what he would call a "quasi-conative tendency". I venture to think that he is himself at times thus led into ambiguity. We may agree to his statement (*Manual*, II., viii., §§ 5, 6) that "a pleasing process is a process which tends to maintain itself". But when we hear that "it will not be denied that there is at least an unconscious tendency to continue a pleasing experience until we have had enough of it," we may be forced to protest. It is far from certain that these two propositions are the same. I should myself agree to the first, though as to its meaning there is much to be said (MIND, No. 49). But I must deny the second until at least I have been told what it does and does not involve. I cannot admit the assertion that pleasure is *always* the result of a satisfied conation, or even that it *always* implies a conation—if, that is, conation stands for what we experience as such, or even for an unconscious striving of our whole nature. But if on the other hand the unconscious conation is that of a mere element in our selves Dr. Stout's language concerning it would hardly be defensible. If in short conation is used for an unconscious tendency I think ambiguity will most probably follow.

conation is really incorrect or superfluous, still I must think that it would be better if its incorrectness or its superfluity were shown, and that from that exhibition there would at least result some gain in clearness.

It may naturally be asked whether the objection which I have raised to the use of "conation," in any sense other than that of experienced conation, applies equally in the case of a term like "activity". Is this term to be confined in psychology to the activity which is apprehended? I have long ago stated that in my opinion it need not be so confined.[1] We commonly speak of the activity of a volcano or of a drug, and may even talk of an effort or a struggle on the part of some material object, just as again we also may speak of its passivity. I am very far from condemning this language even when applied to a material object, and it would surely be absurd if I condemned it when applied to what is higher. We are right, I think, in using these terms either of the soul or again of the self as a whole, or again of any element in the self or soul. A fixed idea would of course be an instance where we might be almost compelled to apply such terms to an element or a group of elements. On the other hand we must distinguish such activity, which is, we may say, only in itself, or in other words only for an outsider, from the activity which is also for that which is active—the activity which is experienced, (*a*) properly in the sense of being apprehended as activity, or (*b*) improperly in the sense of being attended by some feeling which is not itself an apprehension of activity. Whether, however, in the last case we can properly say that the activity is for the mind must certainly (to say the very least) be questioned.

If we observe the above distinctions, and if we do not try to transcend the region of psychical events and their laws

[1] See MIND No. 47, p. 372, and No. 49, p. 33. I have also more recently touched on this distinction in *Appearance*, p. 604. I was led to speak there of the "question, What is the content of activity as it appears to the soul at first, *in distinction from it as it is for an outside observer*, or for the soul later on?" I observe that in making an extract from this passage for a controversial purpose Prof. Ward (*Naturalism*, ii., p. 244) has made his extract end before and short of the words I have now italicised, and has thus himself actually caused the passage to ignore a distinction which it really contains. Prof. Ward, I must presume, was not aware of the meaning attached to the above words, and indeed his misapprehension with regard to my meaning may be described as general. With regard to this extract the reader may perhaps agree with me that the result if unfortunate is instructive.

(cp. MIND, N.S., No. 33), I think we may safely use the term activity within psychology. On the other hand I do not see how psychology can rightly ignore the question of the origin and nature of our apprehension of ourselves as active and of course also as passive.[1]

The term 'conation' is, however, I think, in a different position. Its application to the state of a thing which is not aware of any striving, though not new, is, I presume, not established in psychology. And 'conation' does to my mind suggest naturally an actual awareness of the fact of striving. If, however, we cannot abstain from a different use, we should at least attempt in some way to guard ourselves throughout from ambiguity and confusion. We should, I submit, have some way of distinguishing clearly a conation which is not experienced at all, or not experienced as a conation, from a conation which is really experienced in that character. To confuse these three distinct meanings must surely upon any view be inadmissible.

The great importance of the matter on one hand, and on the other hand my apparent failure at least in part to convey my meaning may perhaps excuse my offering some further desultory remarks on the topic of activity. Some writers wish to build on this as an ultimate fact, and this is the position taken (as I understand) by Prof. Ward in his book on *Naturalism*. I recognise, as we all must, the great merit of Prof. Ward's work, but with regard to this fundamental point I am unable to see that he has made any serious attempt to explain and to defend his view. I venture to think that he has even failed at least in part to understand the objections to which it is exposed. And though I readily admit that there may be some misunderstanding on my side, I cannot suppose that Prof. Ward's position does not call for further explanation.

(*a*) In the first place, however much activity is 'a fact of experience,' a question may still be raised as to the ultimate truth and reality of activity. Apparently Prof. Ward would consider that any question of this kind is inadmissible, but I have been unable to ascertain what his position on this point really is. He does not of course say that activity having no sense or meaning therefore cannot have a meaning which is unsatisfactory, and that we therefore cannot be

[1] A question naturally may be raised as to the minimum which is involved in such an apprehension, and as to whether we can be aware of activity and of passivity in a lower sense, a sense which does not involve agency proper. I have discussed this question at some length in a later article of the present series.

called upon to state the sense in which the term is used. Prof. Ward does not again (as I understand) claim that the content of activity is simple, and that in this it is like, for instance, the aspects of mere pleasure or mere sensation, and is a simple experience which we define not by internal analysis but by designation. And in short with regard to the objection raised against the internal inconsistency of activity I am unable to find in what Prof. Ward's answer consists. On the other hand I have been unable to discover how, if such an objection is not met, his doctrine can be sustained.

(*b*) And the objection which can be urged from the side of our apprehension of activity has not, I venture to think, been met by Prof. Ward. If against a 'Naturalist' it is argued that the 'Naturalist' is in possession of an idea, which possession, if his own theory is true, is in fact not intelligible, Prof. Ward, I understand, is prepared to endorse this argument and to agree that such an objection if made good is fatal. But he seems hardly to realise that the same kind of objection with the same possible consequence has to be answered by himself with regard to activity. If a man is in possession of this idea and if he cannot account for the possession, his doctrine must somewhere, I submit, be fatally defective. This is why even beyond psychology our apprehension of activity must be dealt with and gives rise to a most important problem. And a writer can hardly (it seems to me) get rid of this problem by insisting that he at least distinguishes the fact of activity from our consciousness of the fact—for such an answer would not, at least to my mind, appear to be relevant to the issue. The real issue to my mind is whether Prof. Ward being in possession of the idea of activity—a fact which I presume is admitted—can give an answer to the question how he has become possessed of that idea, an answer, I mean, which judged by his own view is intelligible and consistent. And I cannot find that Prof. Ward has even addressed himself seriously to this question.[1]

[1] I presume that I should be wrong in taking the footnote on p. 44 of the article on "Psychology" to be an attempt to deal with the subject. In the *Journal of Speculative Philosophy*, for October, 1882, p. 378, Prof. Ward has himself noticed the above question as one which requires an answer, and has gone on to indicate what that answer might be. But if in the year 1900 I tried to show that the brief indication was unintelligible or untenable, I might well be accused of serious unfairness. It is to be presumed, I imagine, that Prof. Ward must have modified his opinion as to the objection's force, or as to the answer which could be produced to meet it. I at least understand him now to proceed as if his foundation were no longer threatened by any such objection which, if not met, would be fatal. In fact, if this were not so, the reader, I submit, would have just ground for complaint.

The reader, I take it, is not helped by the assurance that activity and passivity are 'facts of experience' and that we have an 'immediate experience' of them. For no one until otherwise informed can know what such ambiguous phrases are meant to convey, and I may perhaps be allowed to illustrate this by a familiar example. If an unknown drug is administered to me without my knowledge I may next day have an immediate experience of its effects in my feelings and thoughts, but if I said, 'This is why I talk and am able to talk of this drug,' my assertion might be criticised. And even if I insisted perhaps that nothing else in my experience ever felt like that, I should hardly by this addition have made myself consistent. 'What you call your experience,' I should be told, 'is one thing and the knowledge of this drug is another thing. We fail to see how from the first you can arrive at the second. Either your knowledge comes from elsewhere or it is no knowledge at all.' And the same thing surely may be said about an experience of activity. If we assert this experience to be in any sense an apprehension of activity as activity, then, it seems to me, we are bound to reply to the question, What is contained in this apprehension? If on the other hand what we experience does not contain in itself, and so reveal to us, activity as activity, we surely cannot refuse to reply when asked whence comes the knowledge we possess. And if we cannot answer intelligibly our account has surely broken down and as a whole is ruined. And though one might be very wrong in supposing this to be the case with Prof. Ward's doctrine of activity, yet until he has applied himself seriously to meet the above objection, his position, so far as I see, must be regarded as hypothetical or even as precarious.

(*c*) It is, at least in the interest of philosophy, a matter for regret that before attempting to build Theism or anything else on such an ill-defined principle Prof. Ward should not have given us a serious inquiry into its nature. It is unprofitable surely to assert of the subject that it "only *is*, as it is active" (p. 245) when not even the meaning to be given to such a formula is accurately fixed. It would, for instance, be one thing to affirm that there is no being as apart from activity, and another thing to attempt to deny the distinction between them. To assert the mere identity of being and activity does to my mind, after some attempts to avert this result, really end in what is not intelligible. But this, so far as I understand, is not the doctrine which Prof. Ward adopts. And yet even the assertion that apart from activity there is no being at all is to my mind, if not clearly false, at

least highly questionable, and on this point my state of mind is surely not exceptional. In short, whatever may be the view adopted by Prof. Ward as to the relation of activity to being, there will I submit be difficulties which call for discussion and which cannot be disposed of by unexplained assertions. And at the risk of showing prejudice I will add that an inquiry by Prof. Ward unto these fundamental matters would be far more interesting than any attempt to build on hypotheses or on assertions or on the ruins of Naturalism.

II.—THEORIES OF MENTAL ACTIVITY.

By T. Loveday.

Among the many questions that still unhappily divide psychologists into camps and schools there is none which makes so great a rift as that of Mental Activity. In it—the very cockpit of psychology—all the inherent difficulties of the science sum themselves up,—the lack of indigenous terms, the transitoriness of mental processes, and, not least, metaphysical prejudice. The following contribution to the subject keeps to the easier part of criticism, though not without some indications of a definite view. It treats first of Prof. Ward's doctrine; then, somewhat more generally, of conation and the triple division in psychology; and lastly of the theory so fully elaborated by Dr. Stout in his *Analytic Psychology*, a theory of which there has as yet been no adequate discussion.[1]

I. Prof. Ward's Theory.

The first part of this programme will of necessity be short, and it takes the form of appeal rather than criticism. None that have read Prof. Ward's great article in the *Encyclopædia Britannica* can have failed to lament his long silence on psychological questions. That article, though for this country it really deserves the often misapplied title of epoch-making, yet necessarily left many points in need of further development, and above all, perhaps, the question of activity. Many of Prof. Ward's readers must have felt that there is something of mystery about activity as he uses the term; and if they have turned with hope to the pages of *Naturalism and Agnosticism*, they will rather have found that there the mystery has become a sacred mystery, not to be disturbed by unhallowed inquiry. So it seems at least, as I shall attempt to show in a moment; but it is impossible to believe that

[1] Some references will also be found to Dr. Stout's *Manual of Psychology*. They are all made to the first edition of that work, and it has been impossible to alter them in time for the press; but it should be noted that the second edition contains several changes.

Prof. Ward has really adopted a line of thought so remote from the psychological spirit as that which first dubs a difficulty a mystery and then rails at the honest inquirer as sacrilegious. It is, therefore, in the hope that he may some day expound his view more fully that the present appeal for elucidation is penned.

Let us determine more nearly where the difficulties lie. "The elementary facts of mind," says Prof. Ward,[1] "cannot be expressed in less than three propositions: I feel somehow, I know something, I do something." What of the subject of these propositions? It means that everything mental is referred to a Self, and this for psychology is all that is meant by pure Ego or Subject; no metaphysical conceptions are involved. In the following pages Prof. Ward emphasises the importance of subjective selection, attention, and conation or action. He shows how they are dependent on feeling, and how closely akin they are to one another. And finally, he says:[2] "Instead of crediting the subject with an indefinite number of faculties or capacities, we must seek to explain not only reproduction, association, agreement, difference, etc., but all variations of thinking and acting by the laws pertaining to ideas or presentations, leaving to the subject only the one power of variously distributing that attention upon which the intensity of a presentation in part depends. Of this single subjective activity, what we call activity in the narrower sense (as, *e.g.*, purposive movement and intellection), is but a special case, although a very important one." With this is connected the doctrine that, as feeling and attention are not presentations, 'we only know of them by their effects'.

On this last point a word must suffice. Probably all will allow (1) that feelings are directly experienced, (2) that the attention-process involves peculiar feelings, (3) that in recalling a past feeling what we really recall is not the feeling itself but its conditions and circumstances, and these with the aid of our present mood may bring about in us a feeling identical with the original one, but generally weaker than it. Further, it seems that we may deal with feelings conceptually or by means of formulæ, the word and not a present feeling standing as symbol. But whether attention involves any direct experience beyond feeling on the one hand and a change in the character of presentation-content on the other, is a question to be discussed later.

The more important difficulty in Prof. Ward's view will

[1] *Encycl. Brit.*, "Psychology," p. 39*a*. [2] *Ibid.*, p. 44*a*.

be rendered clearer by a further quotation.[1] "The relation of objects to subjects is presentation. . . . As to the subjective relation of objects, the relation of presentation itself, we have merely to note that on the side of the subject it implies what, for want of a better word, may be called attention." "Attention will thus cover part of what is meant by consciousness—so much of it, that is, as answers to being mentally active, active enough at least to 'receive impressions'. Attention on the side of the subject implies intensity on the side of the object." The intensity of a presentation, therefore, depends partly on "its physical intensity," and partly on the amount of attention it receives.

We will not ask whether too much stress has not here been laid upon intensity, nor whether changes in clearness and distinctness should be thus left out of account. Let us proceed at once to the main point of difficulty. We started by allowing a Subject as denoting 'the simple fact that everything mental is referred to a Self'. We are now to consider the Subject as exercising attention and selection. But are the two Subjects one and the same?

For psychology the mere schematic Subject-Object relation is a limit, but the Subject that attends and strives has reasons for so doing, impulses, desires, dispositions; and all these it is the very business of psychology to investigate. Why he attends, how he attends, and what the effects of his attention are, all this is matter for inquiry. No, it may be said, when we refer ideas, volitions, feelings, to a subject, we refer them to a subject of a peculiar character; we show that the unity of his consciousness is conative as well as cognitive, and depends on interest. But if you do so, you have gone beyond Subject in the first sense; you have given the Subject content, and have made it an object for analysis and explanation. Given a man, a lantern, and things illuminated by the lantern, it may be granted at once that the things seen are things the man sees; but we have still to ask what the lantern is, and what the man is looking for, and why.

But is such a metaphor justified by the facts? Justified by Prof. Ward's statements, so far as I understand them, it seems to be. But have we any evidence of this 'supervenient activity,' to use Dr. Stout's expression? I cannot agree with Dr. Stout that 'when and so far as a content is already in consciousness, attention has done its work,' if that means that the whole of consciousness at any moment

[1] *Encycl. Brit.*, "Psychology," p. 41*b*.

is identical with the content to which attention is directed; but certainly presentation of an *object* does involve attention. This perhaps agrees with what Prof. Ward says; the difficulty comes when we are told that 'concentration of attention increases the intensity of a presentation'.[1] Is that a final analysis, or nothing more than a popular description? And does experience warrant our saying more than that we find on the one side increase in intensity (clearness and distinctness), and on the other side, that of the subject in the larger sense, changes of feeling? Possibly; but at any rate so much should not be assumed without discussion.

In short, we want to know what this activity is, and how it works; and this is just what Prof. Ward in his article does not tell us. He contents himself with saying that we know it only by its effects, and some have not unnaturally replied that it is nothing but its effects. But, as was said above, the mystery grows when we turn to *Naturalism and Agnosticism*. That, of course, is not primarily a psychological work, and much that is said about activity in it has no concern with psychology. Still, certain passages have an immediate interest for us. "Many of those who complain that activity is inconceivable, show by their arguments that what they look for are details of how it is done. . . . Thus Mr. Bradley asks, 'What is the content of activity as it appears to the soul at first?' He promises also to be duly grateful to any one who will direct him 'to an experimental inquiry' into its particular conditions!"[2] But why this scornful exclamation mark? As a matter of fact, Mr. Bradley asks for an inquiry "into the conditions under which in fact we *feel* ourselves to be active or passive,"[3] and surely that is a very reasonable request. Why is this one experience to be fenced off from all investigation? Because investigation must be fruitless? But surely we may try. And why must it be fruitless? It must be fruitless only if activity has the same range as consciousness and varies in degree with consciousness. But if that is so, then it is a superfluous and misleading term. Consciousness is a term intelligible, though indefinable; but the activity of consciousness is neither definable nor intelligible. And it is impossible to divide consciousness into parts, one of the subject and one of the object, and to confine activity to the former; for the division is within the conscious experience, not con-

[1] *Encycl. Brit.*, "Psychology," p. 42*a*.
[2] *Naturalism and Agnosticism*, ii., p. 244.
[3] *Appearance and Reality*, 2nd ed., p. 605.

stitutive of it; and, as we have seen, there is a double use of the word Subject. Prof. Ward tells us that whether conceivable or not, activity is a fact; that the perception of activity belongs only to the reflective consciousness, whilst the fact extends to earlier and later stages; and, lastly, that if we ask for the conditions of it, we must transcend experience to get them. We are not to regard activity as an 'appearance,' the conditions of which may be found among other 'appearances,' or we shall come to regard it as 'an illusion, due to certain combinations and successions of sensations'. What exactly is meant here by 'appearance' is not very plain and does not much matter; what that can be which cannot appear is no question for psychology. What we have to maintain is that men do have a direct experience which is called an experience or a perception of activity; and this the psychologist may and must analyse, showing its constituents, conditions and effects. Nor is it in the least illegitimate to examine the concept of activity, as Dr. Stout has done, and to determine the best working use of the term for psychological requirements. But if there is some thing, or state, or act, or fact, properly called activity into whose conditions we cannot inquire without transcending experience, then that is not the perception of activity, and it is not subjective selection or attention or conation, which by Prof. Ward's own statements are conditioned by feeling. It may be matter for theory of knowledge, or for metaphysics, or for some inquiry still more remote; but it can have nothing to do with psychology, nor psychology with it. As in the article we found two Subjects, so throughout the longer work we find two activities.

In conclusion, I would only repeat that what has been said above is not a criticism—for, indeed, it has avoided all details—but an appeal. Doubtless, the difficulties mentioned are due to misunderstanding. Still, the misunderstanding is not wilful, for others have felt the difficulties; and it is greatly to be hoped that Prof. Ward will further expound his purely psychological theory.

II. Conation.

Before proceeding to the main discussion of Dr. Stout's theory, we must, it seems, consider very shortly the common threefold division of mental processes. One view we may, perhaps, dismiss without further consideration, that which in the course of abstraction places by the side of sensations and simple feelings an 'elementary quality of will'. Till

some case of striving, desire, or volition is produced that does not include multiplicity and change of feeling and presentation, such a view has no title to respect.

The difficulty may indeed be pressed further. It would be possible to show that any division of mental life into cognitive, affective, and conative aspects is a division carried through at different levels of abstraction. But leaving this for further consideration let us turn to Dr. Stout's analysis. He adopts as a positive principle of division 'the mode in which consciousness refers to an object,'[1] and the division is to be one of 'ultimate mental functions'. To the result attained there are two sets of objections. In the first place not all 'mental functions' have any reference to an object. Sentience apart—for it is not clear whether sentience is to be regarded as a mental function, or, if not, what it can be at all—feeling is characterised precisely by the fact that it does not refer to an object. In the second place we must ask what is meant by 'ultimate'. On the one hand, it cannot be meant that any concrete state is *either* cognitive, *or* affective, *or* conative; for it is always more than such a disjunction allows. On the other hand, it cannot be meant that further abstractive analysis is impossible, for we can, it is usually held, arrive at sensations and simple feelings. The difficulty is only pointed by consultation of Dr. Stout's *Manual;* for there the three attributes are called 'partial constituents of one concrete whole' and 'different aspects of one and the same process'.[2] But they cannot at once be 'partial constituents' and 'different aspects' and 'ultimate functions'.

Nor do Dr. Stout's more detailed statements lighten the obscurity. Referring to a foot-note[3] for some of them, we will pass on to another point. Dr. Stout has provided[4] two arguments to prove the non-identity of feeling and conation. These arguments certainly seem open to dispute. To the

[1] *Anal. Psych.*, i., 38.

[2] *Manual of Psych.*, i., 56; ii., 581.

[3] On the one hand we find statements that seem to indicate a belief in a bare conation-element—*cf. Anal. Psych.*, vol. i., p. 173, on Activity; p. 167 on the union of activity with thought; p. 189 on anoetic striving; p. 259 on habit; vol. ii., p. 86, on impulse. On the other hand conation is constantly identified with desire, which is certainly secondary. And again desire or conation is one aspect of the activity, which in another light is attention, and from one point of view attention is apperception, and apperception, we are told, involves alike noetic synthesis and retentiveness. But though retentiveness may be original, any definite case of retention cannot be so.

[4] *Anal. Psych.*, i., 119.

first—'they have different objects'—it might be replied that feeling has no object, whilst satisfaction and dissatisfaction cannot be ranked as merely feelings. The second argument is that in longing, hope and the like, the negative mode of feeling accompanies the positive mode of conation. But apart from the arbitrariness of the terms 'positive' and 'negative,' it might be held that the unpleasure in the craving state is connected with aversion to the present circumstances, and that the desire is connected with some pleasantly toned prospect of escape. Nevertheless, to identify conation with any single feeling (and, we may add, to identify it with a vivid idea, or with kinæsthetic sensations from nascent movements) is monstrous psychology. The very supposal that they might possibly be identified presupposes the fiction of a will-element. Conation, like one usage of 'will,' is a very wide term, including states so different as vague hopeless wish and deliberate choice. Whether there is anything common to all the states usually called conative, and, if so, what it is, we shall have to ask at another time; certainly it is no single feeling. So much we have said already, that every conation involves some progression of feelings and ideas; it cannot, therefore, be any one of them. And this explains another point, the lack of any classification of conations as such. If there were a primary something, a bare conation 'towards' or 'fromwards'—if such a view is anything but faculty-psychology—then we ought to be able to exhibit the stages of conation in terms of conation; but, as a matter of fact, where we find specific names there is nothing primary, and, as a rule, the names used are borrowed from cognition. Thus in the *Analytic Psychology* we find sporadic assertions[1] that desire and aversion, habit, impulse, will, attention, are conations, tendencies or propensities, but they are brought into no sort of systematic connexion; whilst in the *Manual*[2] we get the other side of the difficulty, being told to distinguish the perceptual and instinctive impulse, desire which implies ideal representation, and the higher desire which makes towards ideals—obviously a distinction in terms of something other than conation itself.

It seems then that something must be wrong alike with Dr. Stout's division of mental functions and with the ordinary division; and our preliminary conclusion is that the division has not a single basis, and is not drawn throughout at one level.

[1] *Anal. Psych.*, i., 114, 125, 259; ii., 83. [2] *Manual*, ii., 582.

III. Dr. Stout's Theory of Activity.

§ 1. *Activity and the Feeling of Activity.*—It is not the least of Dr. Stout's services to psychology that he has given the world a clear and reasoned account of the meaning that he attaches to this term Activity. If only all writers defined their use of the word with the same care we should perhaps be somewhere near agreement as to the broader issues in mental science. Approaching the question from the side of common speech, and tempering the result to a legitimate extent with philosophical criticism, he concludes that activity always implies self-determination.[1] Mental activity, then, exists when and in so far as process in consciousness is the direct outcome of previous process in consciousness. This, I take it, is Dr. Stout's real definition of activity; the other determinations which he mentions are subordinate[2] and merely happen to be true. The primary definition is, of course, free from objection in the sense that it gives a legitimate use of the term; but difficulties arise with the further determinations. They are three. First, all mental self-determination is partly indirect; purely immanent causality is a fiction. This Dr. Stout has proved thoroughly, and such pure activity may once for all be expelled from psychology. Secondly, mental activity is adaptive and selective, making for an end. To this point we shall return later on. Thirdly, mental activity is always transition, and this transition is consciously experienced. Here we have the 'crux' of Dr. Stout's view.

The statement sounds harmless enough, it is true; but let us try and make clear what we are to understand by this 'experience of transition'. It need not be an 'idea or any kind of cognitive apprehension of the changes';[3] it is immediate, a feeling which 'could and would exist in a purely anoetic consciousness'; it is not cognition, *i.e.*, it does not, in Dr. Stout's terminology, involve a reference to the change as object. Thus Dr. Stout calls it a feeling. Now 'feeling' is a very vague term in English, and Dr. Stout might be using it in some sense of his own; if so, we could only ask him to explain the term a little more clearly. But there can be no doubt at all that, whether or no he attaches another meaning as well to the term, he does at times identify this feeling with the 'feeling of activity' as commonly discussed.

[1] *Anal. Psych.*, i., 148.

[2] The manner of exposition seems to support this statement; but it is not a question of vital importance to the following criticism.

[3] P. 159.

That is quite evident in his polemic against Prof. James. "But it may be," says Dr. Stout,[1] "that what I call a feeling of activity . . . consists in certain muscular sensations." This is the view maintained by Prof. James in accordance with his general theory of feeling, and *he* is certainly referring to a feeling in the strict sense of the word, to that *Thätigkeitsgefühl* of which so much has been written.

It is significant that Dr. Stout mentions three writers who take a view opposed to his own, and that all these three writers, though expounding different theories of activity, are at one in disagreeing with him about the feeling. The fact is that to Dr. Stout's two statements, (1) all mental life is active or self-determined, and (2) this activity exists in being felt, two counter-statements might be opposed: (1) If there were always a feeling of activity, and if it always coincided with or varied concomitantly with the degree of activity or self-determination, still this would be a matter of secondary importance, for the feeling could tell us nothing of the activity, and (2) they do not coincide or vary concomitantly.

(1) The first point has been admirably discussed by Mr. Bradley,[2] and we may treat it very shortly. As to the feeling of activity as a revelation of force, to repeat the gist of Mr. Bradley's argument, it gives us, not a fact, but 'an intellectual construction and a thorough misinterpretation'. In itself, a feeling *of* is ambiguous; at the stage where activity is felt and recognised, as such, it is composite and contains the idea of self-caused change. But to be conscious of this requires much experience; and what sense, when the later constituents are removed, is left to my consciousness of energy put forth? That is to say, the feeling of activity is not able, *quâ* feeling, to tell us anything about activity; no feeling, as such, tells us of more than its own presence. But it may be said that at any rate for the developed mind the feeling is good evidence; for otherwise we should never have called it a feeling of activity. This brings us to the second point.

(2) It is certainly true that within limits the feeling of activity coincides with the real existence of activity. But the limitations are important. In the first place it follows from the nature of feelings that they may be false guides. Of themselves they tell us nothing, as we have seen. They do not prophesy, as Mr. Grant Allen well said; and, we

[1] P. 161. [2] MIND, xi. (1886).

may add, they do not interpret. This is clearest in the case of the unpleasant feelings which act essentially as protective signals. They tell us that something is wrong, not what is wrong. The feeling of fatigue which often occurs when we are capable of excellent work is a favourite example. But have we any reason to believe it less true of the so-called positive feelings that they are liable to misrepresentation? We cannot surely affirm with confidence that the feeling is sound evidence without a considerable amount of experimental inquiry. Mr. Bradley has emphasised the need for such an investigation,[1] and there is just ground for regret that Dr. Stout was unable to fortify his position either by artificial experiments or by nature's experiments as recorded in pathological cases. Still we may probably assume the coincidence of the feeling and the reality to be pretty constant within one other and more important limitation—that of common speech. This is only natural, for the concept as ordinarily used involves the feeling before anything else.

At this point it might seem desirable to offer an analysis of the feeling of activity. We have so far followed one side of Dr. Stout's argument and considered this feeling solely as identical with the feeling of effort, and we ought perhaps to give some account of its nature. But the failure of previous writers to attain a satisfactory analysis by unaided introspection should render any one cautious of making a fresh attempt without experimental assistance.[2] It must therefore suffice for the present to assert dogmatically that the feeling of effort is complex both in breadth and length; that is to say, at any given stage of its existence it is a resultant from a multiplicity of simpler feelings and sensations, and it always exhibits a longer or shorter succession of stages. Prominent amongst its constituents are tension and laxion feelings,[3] and with Prof. James's peripheral explanation we are unable to agree. But more than once in the following pages we shall have to remind ourselves that Dr. Stout attaches another meaning to the phrase 'feeling of activity'; he identifies it with a primary, not necessarily cognitive experience of self-caused mental transition. Now that a

[1] *Appearance and Reality*, 2nd ed., p. 605.

[2] It is most desirable that some of those who have at once time and opportunity should attack this problem seriously from the experimental side.

[3] Whether or not these are taken to be simple is for our purpose unimportant, *cf.* Titchener, *Ztschft. f. Psych.*, xix., 321, and Wundt's important reply, *Phil. Stud.*, xv., 149 (very inadequately noticed in MIND N. S., 33, 139).

non-cognitive experience of change exists one may willingly admit; but is there any evidence that in itself it differs according as it is internally or externally originated? Such evidence as exists—I would refer more especially to Kandinsky's well-known article[1] and to Dr. Stout's own theory of the belief in external reality—seems to point in the other direction.[2] It seems to show that the mark of self-caused change is nothing intrinsic, but just the feeling of effort. But to act as such a mark the feeling must be brought into conscious connexion with the change, and this seems to involve some cognitive distinction of self and objects, however vague. The experience of activity comes therefore in order of development between that of change and an animistic view of force. It arises when with certain changes there coexists a peculiar feeling, that total experience being consciously taken as a whole together. If that is so, the subsequent development of the concept of activity is simple to follow. The changes mentioned, though they are changes of mental states, are not thought of as such. The natural man looks outwards more than inwards; what interests him is not a mental transition as such, but the knowledge that by such and such a movement he has produced a change in the external world. Hence the deep-rooted connexion of activity, action, doing, with 'external volition'. It is only at a later stage that 'inner volition' is thought of as activity, the feeling of effort being found to occur with mental transitions that are followed by no movements, or when intended movements are prevented. Finally the idea is brought into consciously close connexion with that of self,[3] to which it has always implicitly belonged; and thus the way is made ready for criticism, and even for a separation of the concept and the feeling.

But to return from this digression. We had argued that the feeling of effort is evidence of its own existence only.

[1] *Arch. f. Psychiatrie*, xi., 453.

[2] Were there any support for the theory of 'cerebral coenæsthesis,' now so much in vogue among French writers, another possibility would certainly be introduced into the question. As to sensations of innervation, Dr. Stout has made no use of them, so that we have no need to discuss them.

[3] One objection to the above statements (which, it must be admitted, are somewhat hypothetical) may be dismissed in advance—the objection, namely, which might come from those who hold that cognition of self depends on experience of activity or apperception. The unity of apperception and the experience of that unity must not be confounded with the cognition of apperception as unifying activity. The fact of unity and a simple experience of it are necessary to self-experience, and the latter again to cognitive experience of activity.

To this we supposed the objection raised that the feeling appears to coincide with real cases of activity, as self-caused purposive change, and this, it was admitted, is probably the case on the whole within the limits of common speech. It is now evident that this coincidence is due to the fact that the ordinary man abides by a comparatively primitive use of the concept, and does not call himself active unless he has the feeling. But Dr. Stout does not conform to popular usage. His 'feeling' is an immediate experience, but his 'activity' is a conclusion drawn, not from the feeling, but from other grounds; and his assertion of the coincidence of the two is something like an after-thought. For he distinctly maintains[1] that a purely passive consciousness does not exist; but will any one seriously assert of himself that he always feels active? Here it is that Dr. Stout comes into conflict with Prof. Baldwin, and, it must be added, with every plain man. He has enlarged the concept of activity, and that may be legitimate enough; but it is not legitimate to enlarge the meaning of the term 'feeling of activity' at the same time. Prof. Baldwin writes: 'In a state of reminiscence, of reverie, the states of mind are uncontrolled. . . . We are then fully conscious of this play of states, but of no exercise of mental effort accompanying it.' Dr. Stout replies that this is a confusion between activity in general and the special form of it which involves strain or struggle. But the question at present is rather whether there is a confusion between the feeling in general and a special form of it; and we have seen that the feeling always involves, not precisely strain or struggle, but a strong feeling of tension. The fact is that Dr. Stout now enlarges his use of the phrase 'feeling of activity,' and includes under it experience of transition. But that there is a difference between this experience and the feeling proper is plain to the most superficial introspection.

But Dr. Stout has another argument on which he lays more stress. It rests on the fact that though we are inclined to call some states passive—*e.g.*, reverie, we can generally find other states which seem still more passive—*e.g.*, 'the delicious languor of a hot bath'. Therefore, it is concluded, there is evidently a low feeling of activity in reverie, and probably still a feeling of activity, though even lower, in a hot bath. By analogy then, we may reply, every feeling of moderate wretchedness is a feeling of mild pleasure, and the most intense misery is probably only a very much diluted kind of happiness.

[1] *Anal. Psych.*, i., 168.

Once or twice Dr. Stout speaks as if we had an experience of passivity: "We can in every case distinguish between determination from within and determination from without";[1] and more emphatically: "The process of consciousness is, as such, a felt process; its various modalities are also felt; among these modalities is included the antithesis between activity and passivity in all its gradations".[2] But we are told that we are always to some extent active; how can we have a feeling of passivity? It can surely be at best but a feeling of less activity. If this 'lessness' is a difference of quality, then the feeling cannot, as Dr. Stout asserts, be a direct experience *of* activity; for, though we are always more or less active, we should have two direct experiences, and quite dissimilar. If, on the other hand, the feeling of passivity is taken to be similar in quality to that of activity, but of a lower intensity, then we come into direct collision with ordinary and with trained experience; for these assert that the two feelings are antithetical and connected, just as pleasure and unpleasure are connected, by a chain of intermediary feelings passing through a point of neutrality. So that Dr. Stout's theory seems involved in a dilemma: either feelings tell one nothing, as we have asserted, or their information is false.

One of Dr. Stout's arguments against Prof. Baldwin we have purposely omitted, and must deal with now. If reverie is passive because effortless, then Mozart and Scott, who worked without effort, were not active in composing and writing. But surely these are only two cases of a very wide principle that makes against Dr. Stout's identification of activity and feeling of effort, the principle that the intensity of this feeling is a measure of our weakness as much as of our strength, of the obstacles to our activity rather than of that activity itself. That either Mozart or Scott worked absolutely without feeling effort one can scarcely believe; but even granting the facts as stated, and granting also that reverie both feels and is passive, we are not in the least obliged to follow Dr. Stout's *reductio ad absurdum* unless we identify the feeling and the fact. As long as we refuse to do so, Dr. Stout's argument has no force at all.

Would Dr. Stout's other use of the feeling—in reference to the experience of transitions—be of any avail? To this we have already given a negative answer. Between externally and internally determined transitions, as such, there is no difference except in the absence or presence of the

[1] P. 147. [2] P. 166.

accompanying feeling; and it is delusive. And it is plain that we cannot identify the two uses, simply because the feeling of effort is all that gives character to self-determined transition. The results of the confusion are clearly shown in Dr. Stout's rising scale of activities, in which he enumerates seven states, each more active than its predecessor and 'characterised by a far more intense feeling of activity'. Assuming the grades of activity to be as stated, we have to ask how far the feeling of effort and the experience of transitions fall together. In (1) the 'delicious languor of a hot bath,' the feeling is passive, the transitions are few and slow. In (2) to (7) the feeling of effort grows, no doubt; but in (2) and (3), states which partake of the nature of 'ranging,' the mere experience of transitions is probably more lively than in (4) and (5), states occupied with easy arithmetical work.[1]

But is there any third meaning to be attached to the term 'feeling of activity,' or any third immediate perception of the difference between self-determination and external determination? If so it would be desirable to learn definitely what it is. It might, indeed, be possible to maintain that in every active and conative process the cognitive and affective constituents of the process occur in a certain typical order, and that the form of relation of these constituents enters into the experience of the total process, and it might perhaps be shown that both constituents and process are possible only through one another; but the suggestion finds no support in Dr. Stout's use of the 'feeling of activity,' so that it would be out of place to discuss it here.

If this long argument possesses any cogency, it has proved that the feeling of activity and the fact of activity in Dr. Stout's sense do not coincide.[2] We may confidently affirm

[1] *Anal. Psych.*, i., 160, 161.

[2] It is only fair to note that in his more recent *Manual*, Dr. Stout's heart seems to have failed him about the 'feeling'. He struggles to maintain his position, but at the end there comes a very significant passage (i., p 68.): "We must distinguish between activity and the feeling of activity. The only question which introspection can consider is whether we always have some immediate experience of striving, or tendency towards an end. Even if this question is answered in the negative, it may still remain true that conscious process, as a matter of fact, always involves tendency towards an end, though the tendency is not always a mode of being conscious." This grants us nearly all that we claim by way of principle; whether or not the question should be answered in the negative, the reader may decide. But one trace of confusion still remains. The feeling of activity is not itself an experience, immediate or otherwise, of tendency towards an end; it may or may not always coincide with such a tendency, but that is an entirely different question.

that the fact is not immediately given through the feeling but is a conclusion of reasoning. When Dr. Stout says that no mental state is entirely passive, he can hardly mean that he has never felt quite passive, but he argues from some other criterion; and undoubtedly this criterion is the presence of subjective selection and the tendency of all mental process to the full realisation of a relatively unrealised end.

But before we ask whether this tendency can be found in every psychosis—a question which will form a natural stepping-stone to a few necessary remarks upon attention—it will be convenient to emphasise the fact that we have not been in any way attacking Dr. Stout's main contentions with regard to activity, but only his treatment of the feeling, to which he seems to attach unmerited importance. It is possible that he was led to insist so much upon the feeling by the following difficulty. If activity is universal, how do we come to distinguish it at all? As has been shown above, what we first distinguish is the activity-experience, in which the feeling is prominent; but it is easy to identify a preconstructed concept of activity, framed at a later level, with the activity-experience and therefore with the feeling, and then it becomes necessary to insist on the universality of the feeling. Another aspect of the same confusion is to be found in Dr. Stout's extraordinary neglect of passivity and the feeling of passivity, the existence of which cannot, as we have seen, be reconciled with his position. We are told that passive experiences can only exist in relation to active process, but we are not told that the converse is plainly true. Every concrete state includes an active and a passive aspect, and either is unintelligible apart from its complement—such appears to be Dr. Stout's real view. But if in one way he insists too little upon this compound character, in so far as he overemphasises one side, yet in another way he seems to insist too much, namely, in his denial of the passivity of anoetic experiences. From the fact that they would have no existence were one not awake and in some degree attentive he argues that there is no content of consciousness which is not in some manner or degree a modification of our mental activity; and he adds that the tendency of these anoetic modes to divert attention proves their active aspect. But to have an active aspect they must already have attracted attention in some degree, and cannot then be truly anoetic. And how are we to reconcile this doctrine with the statement already quoted that "so far as a content[1] is already in

[1] It is, indeed, possible that by the term 'content' Dr. Stout is confining his statement to cases of presentation of an *object*. If that is

consciousness, attention has done its work, and before it is in consciousness it does not exist, and so attention cannot act upon it"? Surely it cannot be argued from Dr. Stout's standpoint that the anoetic can be at once interesting and without content. Even if Dr. Stout had drawn the necessary distinction between subconscious process that can become a modification of activity and that which can modify activity but cannot itself become such a modification, the difficulty would only be made more remote. We shall find it recurring in the theory of interest, to which, perhaps, it more properly belongs.

§ 2. *Activity and End.*—We come now to the second characteristic of Mental Activity. It is adaptive and selective, making for an end. On this part of the theory there is little criticism to offer. The given, we may say, in mental life is never merely given, but always taken; were we not bent in a certain direction, its material would not be material at all. The lucidity and force of Dr. Stout's arguments on this matter are unequalled, and only in one or two points can difficulty be found.

We have seen that in order of exposition Dr. Stout first arrives at his definition of activity as determination from within, and only secondarily affirms its teleological character. We have to ask whether this latter can be asserted of *all* mental life. If all psychical process is to some extent active, and activity involves an end, it follows that there must be an end in every process, which, so far as the process is a successful one, is also the end *to* it. But as the degree of self-determination differs in different states, it might be asked whether the teleological aspect also has degrees; and either a positive or a negative answer would apparently lead to difficulties. But leaving them aside, we seem to find cases which are hard to force under Dr. Stout's formula. In reverie, for example, where our thoughts range at will, is purpose to be found? Dr. Stout says[1] it is to be found. In the first place, he argues, we are active in so far as we hug our present enjoyment; interruption produces a felt recoil. Secondly, we are active because "reverie involves a train of ideas, and this involves a series of acts in the way of attending, together with a constant process of subjective

so, I have no wish to dispute the statement, though it may be thought open to discussion. Dr. Stout's unfortunate extension of the term 'presentation' to cases of sentience where nothing is presented makes his use of 'content' also ambiguous.

[1] P. 170.

selection". The first argument holds good, in so far as the *whole* state exists as the progressive realisation of an end (very imperfectly apprehended, though, as a rule), the tendency to which maintains every moment of the state. But is the train of associated ideas *within the whole* state also the realisation of any end? If it were, could it be association at all? Does it matter, within pretty broad limits of likes and dislikes, what the ideas are that occur? It is true that we attend to the ideas as they come, though but mildly; but this attention is what Mr. Bradley calls passive. The course of ideas is often dull enough; and though it is true that this state of dulness cannot last long, its only effect seems to be to rouse us from the reverie. Subjective selection, that is, acts but little *within* the dreamy state; but if the latter is very dull, we wake up for a minute, subjective selection takes a new starting-idea, and then we relapse into unselecting reverie again. Attention seems to be confined to a series of successive acts, or rather, perhaps, to a series of successive facts; ideas become successively clear, but their clearness stands outside the process. To take a more extreme instance, it is well known that in fatigue associations 'deteriorate' in quality;[1] the connecting-link is found more often in sound than in significance. Now it certainly seems as if these sound-associations went off 'all of themselves'. There may, of course, be a comprehensive determination to associate, as in the case of the writer who experimented with his friends during an Alpine climb; or there may be no such determination, as when the weary shooter comes home and makes, of necessity and not willingly, a bad pun. But in any case *what* the association turns out to be does not seem to depend at all upon subjective selection. The question is, of course, thorny enough; but it certainly appears necessary to admit a perfectly passive or automatic process of association.

It may not be out of place to make one remark with regard to terminology. This process of automatic sound-association, or again, cases of hallucination, might in quite a legitimate way be called one of mental self-determination, the 'outcome of previous process,' and this would of course lead to further confusion. Might we ask Dr. Stout to mark it off in some way? And in general we may ask whether we are to take *all* association as guided by active selection,[2] or

[1] Aschaffenburg in Kraepelin's *Ps. Arb.*, ii., 1.

[2] A difficulty might also be raised as to the relation of assimilation (in the Wundtian sense) and association. Can any ultimate distinction be drawn between these processes, any distinction that is of more than time

whether (as certain passages indicate) some associations are mere material on a par with external impressions, and what precisely is the relation between the different kinds? Or, to put the same thing in other words, subjective selection partakes of the nature of attention, but some attention seems passively to supervene, and the relation of the two kinds requires elucidation.

§ 3. *Conation, Attention and Feeling.*—This paragraph will deal, first with some minor questions of detail, and then with the relation of feeling to activity. The first problem—mainly a verbal one, perhaps—concerns the exact relations of attention, conation and thought. In his chapter on 'Feeling and Conation'[1] Dr. Stout, aiming to show the intimacy of attention with the latter, speaks more especially of desire and aversion. In half a dozen consecutive sentences he uses the term 'conation' twice and the term 'desire' twice, without intending any distinction, as it seems; and in the whole of the subsequent discussion, where he would show that striving and attention differ only as the direction of activity to an end and the activity itself in the various phases of the process, he uses examples and phrases that apply only to conscious desire. But we have seen that Dr. Stout affirms the presence of attention in states like reverie, where there can be no talk of desire proper; for we can hardly speak of desire except in reference to an end clearly apprehended, and attention seems to be a condition of the existence of ideal ends, and, therefore, prior to desire. This also applies to aversion if taken as the negative mode of desire; whilst if aversion is the negative mode of interest its position will be discussed in a moment. In either case to say that aversion *is* constrained interest seems to be an overemphasis comparable to Stumpf's 'Attention is interest,' or Mr. Bradley's 'Attention consists in interest'. At *least* they are different aspects, and therefore to be related but not confounded. It is only just to add that in one place[2] Dr. Stout seems to class all noetic conation under desire, whilst anoetic striving is 'blind craving'. But surely this is a strange use of terms, and hardly consonant with a passage in the *Manual*.[3]

Concerning the relation of attention and thought Dr. Stout has one very remarkable sentence. His general view, one takes it, must be that attention without thought and thought

and degree? Scarcely—for a dispositional theory at any rate. But at times Dr. Stout seems to go much farther.

[1] I., 125. [2] I., 189. [3] II., 581.

without attention are alike impossible. Thought is one with noetic mentality, and thought proceeds by noetic synthesis ; and this is meaningless apart from attention. Yet we are told [1] that only by its ' union with thought ' does ' activity become attention '. What is thought, then, prior to the union, and what activity ? Mere sentience and blind craving ? But can we ever keep the two apart, that they may subsequently unite and generate attention ? And if they were separate and could then come together, would attention be the product ? Some of Dr. Stout's emphatic statements about sentience preclude the supposition.

Another difficulty concerns the unity of mental process. Dr. Stout holds, one may take it, first, that there is unity in and through every conative process, and, secondly, that the total mental unity is essentially conative. The difficulty is to reconcile these two points with each other, and both with the fact of conflict. Some writers have tended to regard the mind as a system of activities, each of which finds its vitality in another, and all ultimately in the highest ; but this view —useless because of its purely formal nature, its inability to give content to the highest and widest conation, and its doubtful consistency with certain observed facts—does not appear to be upheld by Dr. Stout. His mental systems are connected in a way, it is true, but they are more nearly a conglomeration than an organisation in ranks. That conflict, on which Dr. Stout so often insists, is a fact, no one will wish to deny ; but Dr. Stout has scarcely succeeded in reconciling Conflict, and still less Competition, with the other fact, that of mental unity. Nor would it be unfair to add that in spite of the value of the conception of mental systems regarded as conative, there is still, as in the older Herbartian doctrine, a facile descent therefrom into mythology—a descent which Dr. Stout has himself avoided, no doubt, but one already dangerous for less subtle writers who are adopting his terminology.

These remarks lead us to make one objection to the doctrine of noetic synthesis, which in itself is undoubtedly the high-water mark of English psychology. Dr. Stout presses his theory too much in making it account for almost the whole of mental life. He seems to be too ' hard ' a thinker, and to have too little sympathy with or experience of the softer and more relaxed moments that occupy so large and delightful a part of the lives of many. We have seen that in reverie and in all ' ranging '—to some extent also,

[1] I., 167.

we may add, in the less constructive kinds of pictorial imagination and fancy, and still more in some states of æsthetic contemplation—there is a wide activity that maintains the process, but the inner course of the state itself is either not a process of development at all or else is not a process of development of or to any particular end. In reverie the links of connexion do not appear to be determined by our activity, nor in ranging, nor in some pictorial fancy. Attention is there, but it seems, as we have said, to *supervene* merely. Æsthetic contemplation is sufficiently interesting to merit further discussion. In the enjoyment of such arts as music and architecture,[1] says Dr. Stout, so far as we abstain from criticism, we have moments of simple enjoyment, simple awareness, without judgment. This is most true. If one enters a fine cathedral, for instance, the first moments are spent in a 'taking in' of the total impression. Now here again there is certainly a conation of which these moments are the realisation, and the realising of the desire is in a sense attention. But in another sense attention is struck rather than directed; or, at any rate, there is no noetic development. Upon entering a fairly homogeneous cathedral like Lincoln, or, still better, Salisbury, most people, I suppose, are at first almost overwhelmed with the total impression. Gradually, involuntarily, a development begins; but it is not a strictly active noetic development. It is guided solely by the lines of the building which induce, or rather compel, attention; the parts are then apprehended more distinctly, and so one's impression of the whole becomes more determinate. The process is exactly parallel to Noetic Synthesis, but the point is that it cannot properly be called noetic at all. It starts as mere awareness, and its development (granted the fundamental conation), is determined for us, not by us. The stage of judgment comes later, first in the expression, silent it may be, of emotion, then in the development of reasons supporting and qualifying this expression. Last, as a rule, comes an examination of the structure and style of the building for its own sake. So soon, however, as judgment enters, a noetic process is in movement, and where a cathedral is very composite, as at Winchester, the true noetic process is present almost from the beginning; for there mere contemplation is baffled without the aid of understanding.

Finally let us turn to the vexed question of feeling. Considerations of space preclude any attempt at detailed criti-

[1] P. 107.

cism of Dr. Stout's theory of pleasure and unpleasure,[1] closely bound up though it is with the questions already discussed; some mention of the problems involved cannot however be avoided. And first it may be as well to emphasise the necessary difficulty of reaching any satisfactory solution of the problem of pleasure-unpleasure, so long as one adheres to the customary division of mental processes. We have already pointed out that the division is not made at one level. If we do not speak of Conation merely, but exhibit a definite conation, we are indeed making an abstraction from a whole mental life, but an abstraction of the first order; that is to say, such a conation with its cognitive and affective content may be a genuine fragment of a real or imagined mind's history. But mere pleasure-unpleasure is never genuine in this sense; it is a far more remote abstraction. Mere hedonic tone is never the whole even of the feeling side of consciousness, and there is necessarily a certain air of unreality about all attempts to bring the more abstract into definite relation to the less abstract. This is the more true in Dr. Stout's case, inasmuch as he both neglects to discuss any other feelings than pleasure-unpleasure, and maintains without argument the qualitative identity of all pleasures and of all unpleasures as such, a doctrine with which it is hard to agree. There is nothing to gain by further insistence on this point at present; let us take Dr. Stout's theory as it stands, and examine it from his own standpoint.

"The antithesis between pleasure and pain is coincident with the antithesis between free and impeded progress towards an end. Unimpeded progress is pleasant in proportion to the intensity and complexity of mental excitement. An activity which is thwarted or retarded . . . is painful in proportion to its intensity and complexity, and to the degree of the hindrance. . . . All pain consists in being somehow tantalised, in having a mental tendency at once stimulated and obstructed."[2] With strict consistency Dr. Stout argues that attention does not 'depend on pleasure-pain'. "The coincidence of interest and attention is simply due to the fact that interest, as actually felt at any moment, is nothing but attention itself, considered in its hedonic

[1] This word, though unusual, is necessary. 'Pain' has long been an ambiguous word, the more so since the question of 'pain-sensations' has arisen; and the natural equivalent for '*Unlust*' as distinct from '*Schmerz*' is 'unpleasure,' with its adjective 'unpleasant'. 'Displeasure' has already a fixed sense, whilst 'unpleasantness' refers to objects.

[2] *Anal. Psych.*, ii., 270.

aspect."[1] An object cannot be pleasant or unpleasant for us till we have apprehended it and its significance for us. Nor is it even true to say that pleasant actions tend to be continued, unpleasant actions to be discontinued, because of their hedonic tone. The tendency is to be explained, not by the tone, but by the fact that where there is pleasure and desire there is a free process of activity, and where there is unpleasure and aversion, activity is at once stimulated and blocked.[2]

In short, then, pleasure and unpleasure have no efficacy and no influence whatever upon our behaviour; they are merely resultants. This is a startling conclusion, and much at variance with common experience and popular explanation, the more so, perhaps, if it is pursued one step farther—to the consequence, namely, that, were we deprived of all feeling, our behaviour would be altered not one whit. We should still sniff the rose and avoid the rotting fish, desire money and shun disease, read Goethe and contemn the style of the halfpenny press. Such a position needs strong support, and some of Dr. Stout's arguments are not unambiguous.

In the first place, Dr. Stout's theory fails—indeed he almost gives up the case himself—in the region of sensory feelings. Now it is true that no theory exists which satisfactorily accounts for all classes of pleasures and unpleasures, for the so-called 'physiological' and 'biological' explanations succeed only where such a theory as Dr. Stout's fails, whilst they fail where it succeeds; at the same time no explanation can command thorough assent which does not explain the whole of the facts. Dr. Stout does indeed give[3] some reasons for believing that his theory may hold even for sensory feelings, though these reasons seem rather forced; what it is important to note for our present purpose is rather the admission that "sensations may be pleasant or painful without forming part of an attention-process".[4] He then attempts to palliate this admission by raising what is really a side-issue, and asks whether, when the sensation does arouse attention, the intensification of tone is 'an antecedent or concomitant of the act of attending'. But this is to evade the point at issue; Dr. Stout has admitted a 'normal tone' of sensations outside attention, and the question is simply whether the sensations can excite attention in virtue

[1] *Anal. Psych.*, i., 224 ff. [2] *Ibid.*, i., 229 ff. [3] *Ibid.*, ii., 304.
[4] *Ibid.*, i., 227. How can this be reconciled with the statement quoted above, p. 469-470?

of this tone. Precisely the same difficulty occurs with regard to ideas, especially with regard to those ideas which, serving as a kernel around which many associates, more or less indistinct, are massed, have become possessed through these associates of a strong and, if one may say so, complex tone. Here again there seems to be a normal tone which excites attention. It is no answer to say that such an idea corresponds to a complex cognitive and conative disposition, for that does not of itself disprove the efficacy, partial or entire, of the normal tone.

But these are minor difficulties in comparison with the confusion about interest. As we have seen, interest is "attention in its hedonic aspect". "The object is interesting because it has significance for our practical or theoretical needs."[1] The direction of attention is guided coincidently by the relative excitability of various apperceptive groups and by sense-impressions and associations.[2] But then we learn that amongst these impressions subjective selection singles out "the most interesting, *i.e.*, those which *tend to produce* the greatest amount of change in the most excitable systems". But what is meant by this tendency, if attention *is* interest in its hedonic aspect? Again,[3] Dr. Stout says we may have a 'strong motive' for attending to the disagreeable. But if we ask what the motive is, the reply is 'interest'. "There is one form of painful interest in which attention is fixed with quite exceptional strength." "Where the interest is very strong we may go on working at a puzzling problem long after weariness has set in." Other passages might be cited; these are enough to show that even for normal life Dr. Stout has to introduce interest as a motive, thus abandoning his self-firing conations. To reconcile with his stricter view many notorious facts of pathological life—especially fixed ideas and the phenomena of passive melancholy—would be a superhuman task. It may indeed be argued that interest and its opposite are not identical with pleasure and unpleasure. True, but by Dr. Stout's own admission they are hedonic, they include pleasure and unpleasure. The latter, we have already stated, are an abstraction of many degrees, useful for certain purposes, but a mere will-o'-the-wisp in the present connexion. In contesting Dr. Stout's arguments as they stand we do not in the least commit ourselves to the view that the simple

[1] *Anal. Psych.*, i., 227. How are needs to be interpreted without reference to feeling?

[2] *Ibid.* ii., 163.

[3] *Ibid.* i., 230, 231, 232.

hedonic feelings can exist by themselves, or by themselves can act as motives. We do maintain, however, that they enter into motives as an essential constituent.

The above criticism of Dr. Stout's theory of feeling is anything but adequate. It seemed desirable and even necessary to subject it to some discussion; it seemed undesirable to do so at this stage from any determinate standpoint. But of course no theory is adequately criticised by a mere indication of contradictions. And further, the objections above sketched do not apply to more than one side of Dr. Stout's theory. That hedonic feeling is dependent on the conation-process must in very many cases be admitted to be true. Perhaps it is true in a sense in all cases, though Dr. Stout has scarcely proved it so. None the less feeling might remain essential to motive when conations are regarded, not singly, but as issuing out of one another and as interdependently connected.

In conclusion: whether this lengthy and perhaps tedious criticism of Dr. Stout's theory of activity be justified or not, that theory remains in most essentials untouched, a work of great and permanent value. I have merely tried to show that in some points it is driven too far, and that in places it occasions unnecessary difficulties. Where its real truth and value lies I hope to emphasise at another time by a comparison of it with the only other theory of activity which can be called great and valuable, that of Prof. Wundt.

III.—"THE ETERNAL CONSCIOUSNESS."

By Evander Bradley McGilvary.

For nearly twenty years the philosophical world, at least in England and America, has spent much thought upon Thomas Hill Green's posthumous work, *Prolegomena to Ethics*, and the presumption is that any difficulties and inconsistencies in this work have long ago been detected. Any one would therefore be rash to claim to bring to light any newly discovered perplexities in Green's thought. Prof. Pringle Pattison, in his *Hegelianism and Personality*, has given us the fullest criticism of Green that we now possess; and yet his treatment seems to have two defects. It is in the first place too general; statements are made which, although verifiable, are not always verified by reference to Green's own pages. Such omission is to be expected in republished lectures, and of course is no fault. A more serious defect is that running through the whole of Prof. Pattison's book —the assumption that Green's view is only a restatement of Hegel's. The result of this assumption is that an altogether misleading impression is left upon the reader as to the historical affiliation of Green's doctrine. Green seems to me to show very slight traces of Hegel's influence. The German philosophers who have done most to mould Green's thinking are Kant and Fichte; and nowhere does he make clear that he thoroughly appreciated the significance of the modification which Hegel made upon the views of his idealistic predecessors. Be this as it may, Green is sufficiently important to be considered on his own merits, especially as among almost all writers of the present day he is regarded as the founder in England of a large and active school. It may therefore be worth while to set down the results of an independent examination of Green's argument. All the steps of this argument lead up to the central doctrine of his metaphysics, the famous doctrine of "the eternal consciousness". In dealing critically with this conception, perhaps the hope may be cherished

that its inadequacies will suggest a view more true to reality. Should this hope be realised, no one could rejoice more than Green himself would have done.

Green's metaphysical system starts with the fact that we know the real world. The reality of the world is defined as its unalterableness. "We can attach no meaning to 'reality,' as applied in the world of phenomena, but that of existence under definite and unalterable relations" (p. 53). "A certain hill appears to-day to be near: yesterday under different conditions of atmosphere it appeared to be remote. But the real nature of the event which took place in yesterday's appearance cannot, we judge, thus change. What it was really, it was unalterably. There may have been a change from that appearance to another, but not a change of or in whatever was the reality of the appearance" (p. 27). "With sufficient time and command of detail it would not be difficult to show how the conviction here illustrated, that whatever anything is really it is unalterably, regulates equally our most primitive and our most developed judgments of reality—the every-day supposition of there being a multitude of separate things which remain the same in themselves while their appearances to us alter, and the scientific quest for uniformity or unalterableness in a law of universal change" (p. 28). "The complete determination of an event it may be impossible for our intelligence to arrive at. There may always remain unascertained conditions which may render the relation between an appearance and such conditions of it as we know liable to change. But that there *is* an unalterable order of relations, if we could only find it out, is the presupposition of all our inquiry into the real nature of appearances; and such unalterableness implies their inclusion in one system which leaves nothing outside itself" (pp. 29 and 30). Not only is the system of these relations unalterable, but so are also the relations in the system. "When we analyse our idea of matter of fact, can we express it except as an idea of a relation which is always the same between the same objects?" (p. 19). "Our opinion about its conditions or relations," *i.e.*, those of a sensation, "may vary, but not the conditions or relations themselves, or the sensation determined by them" (p. 28). Reality is thus an unalterable system of unalterable relations between unalterable facts, sensations among others.

Here we reach the first difficulty. What is meant by unalterableness? Upon this question turns the whole meaning of Green's 'eternity,' as will be shown in the sequel.

Green nowhere raises this question explicitly in order to give a definitive answer to it. But a careful examination of the expressions he uses as synonyms for unalterableness seems to leave little doubt what this word meant for him. Quotation has just been made of his definition of matter of fact as "a relation which is *always* the same[1] between the same objects". Two pages before this he refers with approval to the interpretation of sensations as "*always* the same in the same relations" (p. 17). Still again: "Facts, we are sure, are in some way permanent. They are not 'like the bubble on the fountain,' a moment here, then 'gone, and for ever'. . . . The idealism which interprets facts as relations . . . is chargeable with no such outrage on common sense" as is involved in making facts perishable and fleeting existences. "Its whole aim is to articulate coherently the conviction of there being a world of *abiding* realities other than, and determining, the endless flow of our feelings" (p. 39). Once more, after having identified substance as a relation, he proceeds: "By a substance we mean that which is persistent throughout certain appearances. It represents that identical element throughout the appearances, that *permanent* element *throughout the times* of their appearance, in virtue of which they are not merely so many different appearances, but connected changes. A material substance is that which *remains the same with itself* in respect of some of the qualities which we include in our definition of matter—qualities all consisting in some kind of relation—*while* in other respects it changes. . . . It is not that first there is substance, and that then certain changes of it ensue. The substance is the implication of the changes, and has no existence otherwise" (p. 55). Nothing could be more explicit than the identification here made of the sort of unalterable relation in which substance consists, with undifferentiated sameness throughout a time when change is elsewhere taking place. In view of such expressions, one can hardly escape the conviction that by calling relations unalterable Green did not succeed in getting them, even for his own thought, out of time. He merely emphasised their permanence through all time.

But such permanent relations and permanent elements in relation do not exhaust all the reality of the universe, and Green was as free at times to confess this as any one could wish. "Nature, with all that belongs to it, is a process of change: change on a uniform method, no doubt, but change

[1] In this and in all subsequent quotations the italics are mine, except when expressly referred to Green himself.

still. All the relations under which we know it are relations in the way of change or by which change is determined" (p. 22). But the recognition of change is one thing, a satisfactory philosophical reckoning with it is another thing. The spirit in which Green sets out in his dealing with the problem of the endless flux of things in experience seems to me to be unimpeachable. He says in effect: "Accept the flux and then see what it presupposes". But it is of prime importance that we should not misinterpret these presuppositions. And perhaps a reasonably good test of a presupposition is that it shall not render nugatory what presupposes it. At least, this test is of negative value. Let us, using this test, see how our author works back from change and permanence, *both in time*, to a perfect intelligence *out of time*. Let us start with him from the only possible point of departure and climb up under his guidance till we reach the point of beatific vision. Then it might be well to look back and see with the help of this vision how solid a foundation we really started from. If from these lofty heights the lowly ground of experience is seen to be an illusion, then for my part I will "climb down" again and ever after entertain the suspicion that there is too much mirage up yonder.

Starting now from the knowledge of change, we are told that we shall be "bound to admit that in a man who can know nature—for whom there is a 'cosmos of experience'—there is a principle which is not natural and which cannot without a ὕστερον πρότερον be explained as we explain the facts of nature. There are certain accepted doctrines of modern philosophy—*e.g.*, that knowledge is only of phenomena, not of anything unrelated to consciousness, and that object and subject are correlative—from which this conclusion seems to follow inevitably," etc. (p. 14). "A consciousness of events as a related series—experience in the most elementary form in which it can be the beginning of knowledge—has not any element of identity with, and therefore cannot properly be said to develop out of, a mere series of related events, of successive modifications of body or soul. . . . No one and no number of a series of related events can be the consciousness of the series as related. Nor can any product of the series be so either. . . . A consciousness of certain events cannot be anything that thus succeeds them" (pp. 20 and 21). This is the cardinal point on which Green's whole argument turns. He is never tired of repeating this assertion. It is found everywhere where it can conveniently be brought in.[1]

[1] See for some other statements of this principle, pp. 22, 37, and 88.

This is a tremendously important dogma if true. But let us not accept it too hastily just because it is so constantly and confidently asserted; let us look at it somewhat more carefully. 'The derivation of a consciousness of change from a process of change is impossible'—yes, on one condition, and that condition is that such a process should be "a mere series". "A mere series" would properly be the supposed fact that one isolated atomic event follows without rhyme or reason upon another isolated atomic event. It is true that against such a conception of a series Green himself did yeoman's service. And yet Green could continue, in his crowning work, to speak of "a mere series of related events" (p. 20). A mere series of related events is a contradiction in terms. If events are related, they may indeed be serially related and their serial relation may even be a serial relation of temporal succession. But it is impossible without point-blank contradiction to speak of the series as being a mere series. The fact that the events in this series stand in relation involves a continuity between them. Where there is a relation between events, or between any other sort of terms for that matter, there is a community and an identity between them. This identity is, of course, not that of mere sameness. Difference too is involved in the continuity, but neither is this difference mere difference. Now, however much from a certain quarter these statements may be assailed, Green himself at least cannot with propriety be found in the camp of the enemy. A man who can speak of a "many in one" cannot be against us here. And, oddly enough, Green speaks of a "many in one" in connexion with temporal succession, the kind of series in question here. "In this sense," says he, "different states of knowledge succeed each other in the individual . . . and the acts of consciousness in which the several members" of a related whole "are apprehended, as forming a knowledge, are a many in one" (p. 61). That Green could not consistently apply this "many-in-one" doctrine to time is due partly to the fact that he accepted too seriously a view of Kant's, that temporal moments first exist as a sort of temporal chaos and that it is not till the synthesising activity of consciousness orders them into a cosmos that we get time as we know it.[1] This Kantian view by itself however would not account for the whole difficulty. Green added to the Kantian doctrine the further development that the synthetic activity of self-consciousness in man supervenes at a certain stage upon such events

[1] *Kritik der reiner Vernunft*, 1st ed., pp. 99 ff.

as have so far elapsed (p. 89, among other passages). Now see the result of this syncretism. That time should be a real principle of continuity, there is needed such a combining of its moments as introduces unity into them (Kant). This synthesising work begins in time only when the human consciousness comes into being (Green). Therefore all events that occurred in time before human consciousness came into being must have been without unity—unless indeed there were some other consciousness antecedent to human consciousness. Now without unity in time there could be no principle of explanation in it. Without unity in time, the subsequent event could not be related to the prior event as its product, for the very good reason that it is not related to it at all. "No process of development, because no community, can be really traced" (p. 22). Without unity in time we are precluded "from tracing any development of the one into the other, if development implies any identity of principle between the germ and the developed outcome" (p. 88). Hence before the supervention of consciousness in man, unless there had existed some consciousness to give unity to time and thus to make possible an explanation of a later stage by a stage preceding, there would have been a "mere series of events". And events in such a series would have no identity with anything; and of course therefore no identity with any consciousness of the series.

To make this matter a little clearer, suppose we had a series of events, *A*, *B*, *C*, and *D*. Suppose that *D* were the first appearance of consciousness in the series and suppose that until the appearance of *D* there had been no unity in the series. *A*, *B*, and *C* would then be mere *disjecta membra* in mere succession. Not only so, but *D* also, as an event, would be disjoined from the rest, inasmuch as not till after it had appeared in the series was there any principle of unity in the series. Hence, unless there were *already* a consciousness alike of the events, *A*, *B*, and *C*, and of the new event *D*, as a member of the same, there would not be any such correlation of the new event with what had gone before as would constitute any element of identity between them. And therefore *D* cannot properly be said to have developed out of that mere series of events which preceded it.[1]

All this would be convincing enough—once we had granted the premisses. But it is anything but convincing to one who has come to believe, as much by Green's help as by any one's, that the conception of a mere series is an ab-

[1] This is the argument we find on p. 20, and is stated as far as possible in Green's own words.

surdity. On the contrary, once admit that a series is always a series of related elements, and it becomes impossible to assert that succession in time does not always involve the possibility of explanation of the later stage by the earlier—and of the earlier by the later too, if we must be complete in our statements. It is idle to urge the great unlikeness between the different stages of the process; for explanation is not the pointing out of an abstract sameness "between the germ and the developed outcome". If it were, then of course consciousness cannot be explained as developing out of unconsciousness. Consciousness and unconsciousness are in kind as different as any two things can be. But difference, however great, does not involve an utter absence of identity. At least Green cannot be the one to assert that it does. A philosopher who can speak of "a real unity of the manifold, a real multiplicity of that which is one"; a philosopher who can speak of a combination of manifold things "without effacing their severalty" (p. 31); a philosopher who can speak of constituents as "surviving in their multiplicity at the same time that they constitute a single object" (pp. 67 and 68)—such a philosopher surely, having swallowed the camel of a concrete universal, should not strain at the gnat of a particular application of such a universal. And "allotropic causation" is nothing but such an application. Unlike, change and the consciousness of change surely are; but they are at least sufficiently like to live harmoniously together in the bosom of the same time. And this Green admits, however he may disguise this admission by the fiction of a "supervention". And when once any principle of unity, even though it be but the principle of time, gets its grip on differences, other principles of unity will be present at the catch, for principles of unity hunt in packs.

A detailed exhibition of the way in which an identity, other than mere timedness, subsists between change and the consciousness of change, would take a volume; and if it did not prejudice the idea of such a book in the minds of many readers, I would say that there might be some sort of identity—with difference of course—between such a volume and the *Encyclopaedie der philosophischen Wissenschaften im Grundrisse*. In this latter work, he who can read without running and who can appreciate a method even when it is rather fantastically carried out at times, might perhaps make out a real developmental unity between time and the consciousness of time. But we must come back from the German philosopher to the English.

Green gives a reason for the dogma that consciousness cannot develop out of a process of change. But unfortunately the reason seems to be but an unconscious play upon words. "Present" and "presence" are fatal words in Green's pages. Let us look at one or two examples of the uses he makes of them in his argument. "But a consciousness of certain events," says he, "cannot be anything that thus *succeeds* them. It must be equally *present* to all the events of which it is the consciousness. For this reason an intelligent experience, or experience as the source of knowledge, can neither be constituted by events of which it is the experience, nor be a product of them" (p. 21). In other words, consciousness must be *present* to all the events it knows, and therefore it must *not be future* to them! It is one of the stupendous miracles that words can work, that Green should have been caught in a net spread in such plain sight. Without doubt it is such passages as these to which Prof. Pattison has reference when he says that Green avowedly transforms a "theory of knowledge into a metaphysics of existence."[1] Surely it is not necessary to say that there is what may be called the epistemological presence of an object to consciousness, and the temporal co-presence of an object with consciousness. Or to put it in another way, a past event may be present to consciousness as an object of knowledge and—what is an altogether different thing—an event and a knowledge of that event may be present together at a certain point of time. Thus the word 'present' is obviously not a word with which without more ado we may conjure in philosophy. But Green goes along complacently using the word first in one sense and then in another, apparently with a conscience void of offence. Such innocence is personally winsome, but is hardly logically persuasive.[2]

Green gives another reason for this famous dictum that the process of change cannot give rise to the knowledge of change. In this reason the reader will do well to note the *rôle* played by the "many in one". "The acts of consciousness in which the several members are apprehended, as forming a knowledge," acts which in this very passage are said to *succeed each other*, "are a many in one. None is before or after another" (p. 61). The character in which this unity of difference appears is, to say the least, very suspicious. Successive acts of knowledge enter into it;

[1] *Hegelianism and Personality*, p. 23 *et passim*.

[2] If the reader wishes more evidence of such a procedure in Green, let him turn to pp. 22, 34, 39, 60 and 61.

but once in, no one is any longer before or after another. That is, we begin with real succession; this succession is taken up into a unity; and then comes out ravished of its successiveness. A unity behind which such a defloration can occur has an unsavoury likeness to the "chamber door" in Ophelia's song. This is "neutralisation of time" with a vengeance. No wonder that Green speaks of the "seemingly paradoxical character of every-day perception" (p. 71).

There is still another queer fallacy which helps to support the doctrine of the unsuccessive character of knowledge. Green speaks of an "ambiguity attending all our terms expressive of mental activity—knowledge, conception, perception, etc.—which may denote events in our mental history, the passing into certain states of consciousness, as well as that of which in those states we are conscious, the content and object of consciousness" (p. 62). It may be pointed out here that he recognises also a third meaning as belonging to these words. They may denote what he aptly calls "the one indivisible reality of our consciousness" (p. 73), *i.e.*, the organic whole of subject and object, a whole in which all the distinctions of subject and object are kept, but kept as *distinctions*, not as agents effecting a divorce. It is well worth while to have pointed out this ambiguity, but it would have been better worth while to have avoided falling a victim to it. It is one of the instances of the irony of fate that the man who takes such pains to make these distinctions should have proceeded immediately to wrap them up in a mist of confusion so dense that he himself forgot what manner of distinctions they were. "The only agent that we know as maintaining an identity with itself throughout a series of changes, or as a principle that can unite a manifold without cancelling its multiplicity" is "thought or spirit or self-consciousness" (p. 37). This statement is first made of consciousness as it truly exists in the concrete, that is, in the sense of "the one indivisible reality of our consciousness". We are warned by Green himself that in thinking such an intelligence we must not fall into the "impossible supposition that there is a double consciousness in man" (p. 73). "In seeking to understand its reality we have to look at it from two different points of view; and the different conceptions that we form of it, as looked at from these points, do not admit of being united, any more than do our impressions of opposite sides of the same shield; and as we apply the same term consciousness to it, from whichever point of view we contemplate it, the ambiguity noticed necessarily attends that term" (p. 73). Here he begins on the path of illegitimate

abstraction and soon finds that the way of transgressors is hard. Having thus wrenched away from the indivisible unity of consciousness this aspect of content, Green found that it could not exist alone. It presupposes something. What is this something? The most obvious answer would be "the one indivisible reality of our consciousness" from which this aspect was at first abstracted. If this answer had been given, then the unalterable order of relations, which forms the aspect of content, would have been reunited with the other aspect of consciousness *i.e.*, "events in our mental history" (p. 62). This would have been a happy consummation to the whole divisive operation.

But it would have been too simple a procedure. At any rate Green found another presupposition for the unalterable order of relations, and he found it in the shape of "an eternal consciousness". He does not, indeed, break away altogether from the unity of "our combining intelligence" (p. 32). He recognises "as the condition of this reality" which consists in the system of unalterable relations, "the action of some unifying principle *analogous* to that of our understanding". But why resort to analogues when we have the real thing ready to hand?

Before we answer this question, let us put Green's argumentation clearly before us. An indivisible unity is separated into two parts. One of these parts, after this separation, is seen to be partial; its constituents are "relations to which an existence on their own account is fictitiously ascribed" (p. 43). Although "taken to stand for independent agents," they "are in fact names for substantiated relations between phenomena" (*ibid.*). They must therefore be supplemented, and supplemented they forthwith are—not however by what in actual fact they have been divorced from, but—by a principle of which Green can say nothing without falling into contradictions. This behaviour is precisely the same as if I had begun to speak of her Majesty, the Queen of England;[1] then proceeded to abstract her queenship from her domain, and now, seeing that she must be the queen of something, ended by saying that she is the august sovereign of—Utopia.

Green was too good a logician to reason this way without being forced to it by considerations that seemed to him to warrant such a performance. These considerations were found in the fact that *our* consciousness is "perpetually *altering* its views of the relations determining any experience

[1] This article was written nearly two years ago, hence the reference to her late Majesty, as well as the absence of reference to recent articles on Green.

under the necessity of combining them in one system with other recognised relations" (p. 17). We are "beings that think only at times" (pp. 53 and 54), and it is not to be thought for a moment that such ephemeral and variable creatures could bear the weight of an unalterable reality upon their shoulders. This would "imply the absurdity that nature comes into existence in the process by which this person or that begins to think"—a supposition "which on examination will be found to involve impossibilities analogous to those which prevent us from supposing that nature so comes into existence" (p. 38). Hence we must say that the true account of the presupposition of reality is "that the concrete whole which may be described indifferently as an eternal intelligence realised in the related facts of the world, or a system of related facts rendered possible by such an intelligence, partially and gradually reproduces itself in us, communicating piecemeal, but in inseparable correlation, understanding and the facts understood, experience and the experienced world" (p. 38).

We have now reached the point where we can inquire what Green meant by the eternity of his spiritual principle and what he meant by the reproduction of this principle in man. The word "eternal" as an epithet applied to consciousness is not self-explanatory. It has too many meanings in philosophy. The only way we can arrive at Green's meaning is to examine the function he ascribes to this consciousness, and also the few expressions he employs in reference to it.

The supreme function performed by the eternal consciousness is that of affording as it were a locus for the unalterable relations constitutive of reality. It is by this eternal consciousness that all real things consist. Its eternity is therefore just such an eternity as can be the medium "in and through which that unification of the manifold can take place which is necessary to constitute relation" (p. 48), and an unalterable system of relations. Now the character of eternity as presupposition must evidently be determined by the character of the realities which presuppose it. Or to put it in Green's own words, "the unity of this principle must be correlative to the unity of the experience" which it renders possible (p. 35). We have already found that the permanence of the relations which constitute the reality of experience is temporal permanence—absolute invariability in a world of change. Naturally we should therefore expect the eternal consciousness to have the same kind of immutability. But such an intelligence would seem to be one with a before and an after within it. Yet this Green stoutly denies, even

of human intelligence. *Within*[1] the consciousness that events "are related in the way of before and after there is no before and after" (p. 59). But along with this denial he uses language which is inconsistent with the denial. For instance, "if there is such a thing as a connected experience of related objects, there must be operative in consciousness a unifying principle, which not only presents related objects to itself, but at once renders them objects and unites them in relation to each other by this act of presentation; and which is single *throughout the experience*" (pp. 34 and 35). This is consistently to make the unity of this principle "correlative to the unity of our experience". That this is the characteristic feature, not of our consciousness merely, but of all consciousness, is shown in the next sentence but one. "If all possible experience of related objects—the experience of 1,000 years ago and the experience of to-day, the experience which I have here and that which I might have in any other region of space—forms a single system; if there can be no such thing as an experience of unrelated objects; then there must be a corresponding singleness in that principle of consciousness which forms the bond of relation between the objects" (*ibid*). This means that consciousness *qua* consciousness, not *qua* finite consciousness, must be single throughout the duration—and throughout the spatial extension—of the experience which it reduces to unity. Now this result seems to coincide with the position of Locke, which Green so unmercifully criticised in his *Introduction to Hume*. This would indicate the fact that although Green saw the unsatisfactoriness of Locke's eternity and omnipresence, he had no other conception to substitute for it; and when it became necessary for him to speak in positive terms of his spiritual principle, he had to fall back on Locke's language in default of anything better. That he could only make negative statements of the nature of this consciousness as it is in itself or in its completeness Green himself frankly acknowledges (p. 54), but the extent to which he was tied down to negative statements as to what that consciousness is for us, he did not seem to realise. For, as we see, when he made positive statements about it, he said in effect what he was so hard on poor Locke for saying before him.

This representation of consciousness as lasting through time recurs again and again in Green. He speaks of self-consciousness or thought or spirit as "the only agent that we know as maintaining an identity with itself *throughout a*

[1] Green's italics.

series of changes (p. 37). Again he says: "The difference between what may be called broadly the Kantian view and the ordinary view is this, that whereas, according to the latter, it is a world in which thought is no necessary factor that is *prior to*, and independent of, the process by which this or that individual becomes acquainted with it, according to the former it is a world *already* determined by thought, and existing only in relation to thought, that is thus *prior* to, and conditions, our individual acquaintance with it" (p. 38). What is thus "called broadly the Kantian view" is of course Green's own view, as the whole context shows. There are two contrasts here made between this and the ordinary view. First, according to Green, the world exists "only in relation to thought"; according to the popular view, it is "a world in which thought is no necessary factor". Secondly, over against the ordinary view that thought is not prior to the process of individual experience, Green defends the doctrine that the world of experience is "already determined by thought". Nothing can be clearer than that here thought is represented as prior to the experience of this or that individual, and by virtue of this pre-existence able to pre-determine the world. Now this pre-existing thought Green identifies with the "eternal intelligence". Hence intelligence is eternal by reason of the fact that although in time it has no beginning.

This temporal duration of the eternal intelligence is again brought out very clearly in another passage: "But we cannot suppose that those relations of facts or objects in consciousness, which constitute any piece of knowledge of which a man becomes master, first come into being when he attains that knowledge; that they pass through the process by which he laboriously learns, or gradually cease to be as he forgets or becomes confused. They must exist as part of an eternal universe—and that a spiritual universe or universe of consciousness—*during all the changes* of the individual's attitude towards them, whether he is asleep or awake, distracted or attentive, ignorant or informed. It is a commonplace indeed to assert that the order of the universe remains the same. . . . But the unchanging order is an order of relations. . . . As known they exist only for consciousness. . . . We must hold then that there is a consciousness for which the relations of fact, that form the object of our gradually attained knowledge, *already* and eternally exist" (pp. 74 and 75). Can anything be more explicit than this identification of eternity, whether of the universe or of the consciousness for which the universe exists, with unchanging duration through all

the changes of time? It is thus that this consciousness can be called "a completed knowledge" (p. 74).

But it is also true that in the same passage Green speaks "of the system of thought or knowledge which realises or reproduces itself in the individual" and describes it as "a system into the inner constitution of which no relations of time enter" (p. 74). How then are we going to reconcile these two representations? Perhaps the most satisfactory way is to say that the denial of before and after in the eternal consciousness is nothing but the denial that there is any real difference between what is before and what is after. I believe that this interpretation is put beyond doubt by a passage in which Green speaks of "the relations, characteristic of knowledge, into which time does not enter, which are not in becoming but are once for all what they are" (p. 73). Is not this to say that what negatively is described as not in becoming, as precluding time from its "make-up," is positively defined by saying that it always is what it ever is. Whatever may be thought of this attempt to reconcile certain passages in the *Prolegomena* with each other, the fact cannot be disputed that these two sets of passages jostle each other on the very same page. I will close this part of the paper by quoting two expressions that thus stare each other in the face. A consciousness which holds sensations "in relation therefore *cannot* itself be before or after them, or *exist as a succession* at all. And *every step forward in real intelligence* . . . is only explicable on the supposition that successive reports of the senses . . . are determined by consciousness . . . which is operative *throughout their succession*" (p. 75).

When we come to the question what is the relation between our consciousness, which as even Green at times admits has a history, and the eternal consciousness, we have notoriously vague statements. Green's defenders may take refuge in saying that these statements are obviously metaphorical; but there is no indication that the metaphor is not to be strictly carried out. The passage in which the relation is most fully treated is introduced with an explicit promise that an explanation is to be furnished us. "It will be found, we believe, that this apparent state of the case can only be *explained* by supposing that in the growth of our experience, in the process of our learning to know the world, an animal organism, which has its history in time, gradually becomes the vehicle of an eternally complete consciousness. What we call our mental history is not a history of this consciousness, which in itself can have no history, but

a history of the process by which the animal organism becomes its vehicle. 'Our 'consciousness' may mean either of two things; either a function of the animal organism, which is being made, gradually and with interruptions, a vehicle of the eternal consciousness; or that eternal consciousness itself, as making the animal organism its vehicle and subject to certain limitations in so doing, but retaining its essential characteristic as independent of time, as the determinant of becoming, which has not and does not itself become" (p. 72). There are two expressions which call for our attention here, "function" and "vehicle".

What is meant by a "function of the animal organism"? Green himself would of course not mean anything that could savour of making our consciousness a secretion of the brain. Function must here be used in its mathematical sense of that which varies with the variation of something else. Consciousness, then, in one of its meanings is something that varies as the animal organism varies, and this animal organism is being made the vehicle of the eternal consciousness. But to say that consciousness thus varies is to say that it is in process, which is just what this whole passage was written to deny. Green's whole purpose here is to explain away the seeming variation of our consciousness. "The very consciousness, which holds together successive events as equally present, has itself apparently a history in time. It seems to vary from moment to moment. It apprehends processes of becoming in a manner which implies that past stages of the becoming are present to it as known facts; yet is it not itself coming to be what it has not been?" It is in answer to this very pertinent question, that Green has made the distinction between the two senses of the word consciousness. "The consciousness which varies from moment to moment, which is in succession, and of which each successive state depends on a series of 'external and internal' events, is consciousness in the former sense. It consists in what may properly be called phenomena; in successive modifications of the animal organism, which would not, it is true, be what they are if they were not media for the realisation of an eternal consciousness, but which are not this consciousness" (pp. 72 and 73). Here again Green seems to be guilty of playing fast and loose with words. It is correct enough to speak of our consciousness as a function of the animal organism, but as such it is not that animal organism. Green however seems to think that a function of a thing may be that very thing, for he says that our consciousness which is a "function of

the animal organism" "consists in successive modifications of the animal organism". Evidently the word function has no right here at all. It serves merely to allay our suspicions at the beginning of the process of identification of our temporal consciousness with the changes of our bodily states. Take the word function away; make the third sentence in section 67 consistent with the fifth, and then we should read: "Our consciousness may mean either of two things; either changes of the animal organism or an eternal consciousness into which time does not enter," etc. Such an equation of our timed consciousness at the outset with nerve-processes would be immediately rejected by every one who was not an outright materialist; but first use the word function and then replace it by the word modification and the whole thing goes without challenge, with all its naïve reduction of psychology to physiology.

Having thus taken away our consciousness in so far as it has a history in time, let us see what sort of consciousness we have left. There is still the eternal consciousness which makes the animal organism its vehicle. If one chose and were witty enough, one could very well make merry over the idea of a timed organism bearing a timeless rider, and ask how the mount was accomplished. For accomplished it must have been, inasmuch as the steed has had in no case a very long existence. To such a levity the serious Greenian would reply that figures of speech must not be pressed too far. Precisely. But figures of speech should figure forth something. There is not, so far as I know, the slightest objection to the use of metaphor and simile in philosophy. But if they are to be used, they must be transparent and let the literal truth shine through—else philosophy cannot escape the charge of mystification and the darkening counsel with the multitude of words. Mystery and philosophy do not mix much better than do oil and water. It is of course conceivable that after philosophy has said its all, mystery remains; but that residuum is neither explanation or philosophy. Unfortunately however for those who would not have us press Green's expressions home, Green, as we saw, began the paragraph in which they appear, with the assurance that an explanation was forthcoming.

But let us waive this point. There is left one statement that cannot but be taken at its face value. The eternal consciousness makes the timed animal organism its vehicle, "subject to certain limitations in so doing" (p. 72). What are these limitations? An unsophisticated answer would have been that time is the most important of them. For if

we are to consult our experience we should all of us say that even if there is an eternal consciousness that reproduces itself in us, this reproduction takes the form of temporal change. *Our* consciousness not only seems to vary but does really vary from moment to moment. It itself has come to be what it has not been. If we cannot predicate change of our consciousness, I for one know not anything of which we may with better right predicate it, and instead of having to assume an eternal consciousness to make change possible, I should be disposed to say that such an eternal consciousness is not necessary, inasmuch as there is no change to need it as presupposition. But Green evidently thought otherwise. The eternal consciousness in making the animal organism its vehicle still "retains its essential characteristic as independent of time, as the determinant of becoming, which has not and does not itself become" (p. 72).

In this paper I have tried to get some consistent interpretation of Green's view of the eternal consciousness, to show the fallacies which, as I read him, he commits in his argument as to this eternal consciousness, and to point out that when he has got his eternal consciousness he cannot bring it to terms with our temporal consciousness. The paper must not close without asking the question whether, with a rejection of Green's conception of eternity, all eternity passes away with it. If eternity means everlasting self-identity without difference, then, so far as I can see, it is a pure myth. But there are other meanings of the word all sanctioned by good philosophical usage.

1. The universe as the organic whole of past, present and future, knit together by universal law, is indeed a whole whose parts are in time, but which is not itself *as a whole* in time. For a thing to be in time it must be contemporaneous with certain other things, be before some, and after others. But the universe as a whole is neither before nor after nor simultaneous with anything else. To speak of the whole universe as timed is very much like saying that the totality of the physical universe is in motion. Everything in the universe may be in motion, but of the universe as a whole, spatial motion cannot be predicated without absurdity. Exactly in the same way temporal change of the universe as a whole is unmeaning. Now this timelessness of the whole universe as a system of timed parts is what has been called eternity. We may call it metaphysical eternity.

2. But this is not the whole truth. Each element in the universe, say the present moment, is not a vapour that appeareth for a time and then vanisheth away. While from

one point of view all things "in silence ripen, fall, and cease," from another point of view it is true that "sure as life holds all parts together, death holds all parts together". An important philosopher has said: "Only the present is; the past and the future are not. Still the concrete present is the result of the past and is pregnant with the future. Therefore the true present is eternity." The fact that the past does not now exist as present, it is useless to deny. As past it is gone, never to return. But it has not by its going become as if it had never been. It is eternal in that, though it will nevermore be temporally present again, it lives on in its effects. Though dead it yet speaketh. It has joined "the choir invisible". And likewise of the future we must say that though it is not now present and never has been present in all the ages of the past, yet it retroactively worked in such wise that not one event in the past would have been as it was were not the future to be exactly what it will be when in time it comes to be. This is the presupposition of science, and as such is a truth of philosophy. This dynamic presence of any event you choose in time to every other event in time, no matter how remote, is a transcendence of time on the part of an occurrence which while thus transcending time keeps inalienably its fixed place in the order of time. If one is allowed to speak in a figure here, it might be said that every event in the past, although with one foot caught inextricably in the grave, has the other foot free to roam all over time. And this dynamic transcendence of time is eternity in a second sense. We may call it dynamic eternity.

3. In still another sense can eternity be used. While it is true that every event reaches out infinitely before and after, some persons will continue to prefer to say that it is present at every moment of time in potency rather than in person. But not so with consciousness as we know it. While firmly rooted to its definite locus of occurrence, still as an occurrence *that knows* it is bounded by no fixed horizon in time. With sufficient data, it is capable of knowing any event whatever, however remotely past or remotely future. And in knowing it, consciousness is present to that event, not in time, as Green was misled to imagine, but epistemologically, if a certain tautology is pardonable on the score of necessary reiteration against a mistake. Cognition is a functional transcendence of time, and because a transcendence of time it is eternal. It is timed as an event, it is eternal as a knowing event.

These three senses of the word eternal must be scrupulously kept distinct, at the peril of confused thinking. And yet they have a real identity in that in all the three eternities

there is a transcendence of time, and in all this transcendence there is not an annihilation or "neutralisation of time". Besides, what is eternal in the second or third sense is eternal only by virtue of inclusion in what is eternal in the first sense. And—what must not be lost sight of—that which is eternal in the first sense is not so in independence of the other eternities any more than the body is independent of its members. An idealism of a modest but firm sort is perhaps implied in this inter-articulation of these three eternities, but into this we cannot go at present. Nor can we discuss at length the difficulties that attach to the notion of the reality of the past and the future. The limitations of space require that this subject be reserved for future discussion.

IV.—THE DYNAMICS OF ATTENTION.[1]

By Gustav Spiller.

1. *Attention and Inattention.*—It is winter time, and several of us are sitting around the blazing waiting-room fire. While the others are busily talking, I am reading. The rumbling of trains penetrates from the depths beneath. Doors are being noisily opened and shut. Some persons are speaking loudly now and then in different parts of the spacious room, while others may be heard crossing it. The street below sends its quota of noises. The place is haunted by sounds, if we but incline our ears. As with the sense of hearing, so with the sense of sight and with general sensibility. Yet, since the book I am interested in contains extremely hard passages, I am entirely absorbed in what I read. Consequently, so it seems, I hear nothing, I see nothing (except the page before me), I smell nothing, and I feel nothing. Or did I really hear and see and smell and feel, and have forgotten that I did so?

2. *Sensations, Images and Feelings Do Not Exist apart from Attention.*—To test the likelihood of this conjecture, let us inquire into what is implied in following a conversation. In attending to speech we make good what is not pronounced what is half-pronounced, or what we do not hear. We put spaces between the words. We range them into sentences, and the sentences into paragraphs. Inwardly, we track the trend of thought. For the purpose of illuminating what is put forward, memories of all kinds are awakened, involving sometimes a considerable strain. On the other hand, what is irrelevant to the conversation is kept jealously apart. The rumbling of trains, the opening and shutting of doors, the movements of persons about the room, the chatter of other

[1] I have assumed, what I feel to be indisputable, that physiology offers as yet no scientific data of an advanced nature for the student of psychology.

For convenience' sake I have retained the term Attention, in spite of its vagueness and its treacherous implications. My own opinions are summed up in § 20, and more especially in the last paragraph of that section.

groups, the street noises, must not be intermingled with the conversation, or else chaos will supervene. As with irrelevant sounds, so with what is irrelevant in general. Plainly, to follow a conversation argues a complex process. That process, in the case we are considering, implies a double direction. We must make sense of what is said; and we must banish what is irrelevant. If that be so, it becomes probable that I could not have followed the conversation while I was absorbed in reading. I was occupied with the book. Everything else I could not even have recognised as something or as a mass, unless the course of attention had changed. The sounds, sights, and other sensations—supposing, what is a contradiction, that there were such for me—jostled each other freely, and possessed precisely a like value. They were ranged in time, and not in order. The ordering is a distinct act.

A puzzle picture will help to elucidate the part which the sense of order plays. If we do not at once perceive the hidden figures, it is not because the outlines are not there. They are there just as much, or as little, as are the outlines of the figures first observed. It is only a certain form of education, leaving aside heredity, which forces us to see one set of lines to the exclusion of another set. Apart from educated activity of an advanced character there are only lines on the card, and the business of the attention is the formation of these lines into a distinct whole. When the attention is not directed to that task, we have no whole whatever. Indeed, the background, the lines, and the surrounding objects are one indifferent mass, or have passed away altogether, when the attention is withdrawn from them. To discern a single line, preventing fusion with the background and with the surroundings, to discern at all, implies attention.

Some geometrical patterns offer another convenient illustration. According as we direct our attention, so the lines form one whole or another.[1]

Lastly, any bold sketch in black and white brings out strikingly the importance of regulative activity in forming an intelligible whole out of scattered lines and hints.

One may now with confidence answer in the negative the

[1] The question of visual illusions is fully dealt with by Lipps, *Raumaesthetik*, 1897. The reader may also consult James, *Psychology*, 1890; Sully, *Illusions*, 1895; Judd, "A Study of Geometrical Illusions," *Psychological Review*, 1899; Thiéry, "Ueber geometrisch-optische Täuschungen," *Phil. Studien*, 1895; Bolton, "Illusions," *American Journal of Psychology*, 1898; Jastrow, "Illusions," *American Journal of Psychology*, 1892; and Wundt, *Die geometrisch-optischen Täuschungen*, 1898.

question which we asked at the end of the first section. Apart from acute attention, *i.e.*, complex activity, there is no such thing as a conversation, and hence, as I did not busy myself with it, I could not have followed its windings. To this must be added that the simplest sensation implies a complicated process. We are justified, therefore, in concluding that nothing intelligible—no total, no detail, no form—exists for us in the absence of attention. The whole outer world as given by the senses, as well as the whole inner world, is essentially dependent upon it. In walking along the street every object we meet with, however faintly perceived, is, *qua* perceived object, due to an intricate process.

3. *Attention is Dependent on Stimuli.—Ex nihilo nihil fit* remains nevertheless true in psychology. Attention, at least physiologically considered, is powerless in the absence of extra-organic or organic stimuli, and is conditioned by their differences. Bent on attending, we may hear or we may see; but we cannot indifferently hear or see. Only certain light-waves or sound-waves, or what corresponds to them, lead to sight and hearing, while in their absence there will be neither visual nor auditory sensations. Yet it still is true that sensations and images, as such, are essentially connected with the action of the central nervous system. Open eyes and open ears, unless exploited, yield neither sight nor hearing. They offer faint modifications, void of tangible significance, which, if they are not instantly, or within a few seconds, utilised, remain lost for ever. They cannot, by any effort, be afterwards elaborated into a self-sufficing system of thought, *e.g.*, the conversation which I missed I cannot build up afterwards by any effort of the will. It happens, though, occasionally that we have been told something very rapidly, and that we only decipher the word or the phrase after a moment or two. Here, however, there is something definite to work upon. There is before us a distinct whole which, by re-attention, is transformed into another whole.[1]

We have advanced a step. Not only could I not have followed the conversation because of absence of attention; but to me, fully absorbed as I was, there came only doubtful impressions, and no sound or other sensation.

4. *Keen, Normal, and Lax Attention.*—We have seen that the endeavour to understand difficult paragraphs was inconsistent with following a conversation. What is the fact which explains this inconsistency? Why should keen activity in

[1] As to this last point, see Daniels, "The Memory After-image and Attention," *American Journal of Psychology*, 1895; also Lotze, *Psychologie*, 1881, ch. iii., § 4.

some directions exclude keen activity in other directions? Further investigation will, we hope, supply the explanation. Meanwhile we may here profitably investigate into the degrees of attention.

The book which I read I found, at best, troublesome to follow. To secure adequate apprehension, intricate passages, with their windings and interconnexions, had to be grasped simultaneously. In trying to assimilate what I was reading, the attention had to be more and more restricted to the elucidation of some detail, and had to be kept fixed on that. I had to be oblivious of everything that passed about me. Such *keenness*, such prolonged preference, is, however, not common. It more frequently happens that we are interrupted by a conversation going on near us, or by any striking sound or sight or other sensation. Usually we should find it difficult not to listen to at least parts of the conversation, and commonly we should also notice various trifles. In this *normal* condition the field of attention is not determined for any length of time by just one thought, and we are not so absorbed that we could not be easily aroused. We still ignore the majority of objects around us; but these are not of a nature to appeal to us strongly. Advancing another step, in the opposite direction to that of being absorbed, the attention becomes *lax*, and we find ourselves rambling in thought, following everything in turn, but nothing long. We are, in fact, in a state of reverie: more open to overtures, and the field of activity changing repeatedly. We see hence that: (*a*) in *keen* attention we are *almost wholly* oblivious of our surroundings (inner and outer); (*b*) in *normal* attention, we are *to some extent* oblivious of our surroundings; and (*c*) in *lax* attention, we are guided *almost solely* by casual impressions derived from our surroundings (inner and outer).

To conclude. *Looking about me carelessly I notice little in each of a large number of objects. Looking closely I apprehend about as much in one of those objects.*[1] The amount observed

[1] "The greater the number of objects to which our consciousness is simultaneously extended, the smaller is the intensity with which it is able to consider each." So writes Hamilton, *Metaphysics*, ed. 1877, i., p. 237. From the point of view of attention the distribution, and not the intensity, is changed. We notice a dozen points in a grain of sand, instead of a dozen points in the sea-shore where the grain lay. So also I see the fanciful wall-paper as well as a picture on the wall. Instead, I may lessen the wall-paper detail, and increase the picture detail, and further increase the points as to one figure of the picture at the expense of all other details. Lastly, I may attend principally to the fan in the picture or to a flower on that fan, which flower I had not at first noticed

has remained the same in both instances.[1] Whether attention is keen, normal, or lax, entails no difference as to the quantity dealt with.

5. *Attention, in the Normal Waking State, Is Quantitatively alike with All Men at All Times.*—It appears from the above that the total quantity of attention or neural activity is always the same, or nearly so, increased activity in one direction being at the expense of decreased activity in another. Attention, again, being transformation or expenditure of energy —on the physiological side—we can understand how it is that, if our fund is limited, employing labour in one direction, as in concentrating our forces on the niceties of one problem, we are debarred from employing the same part of the fund in another direction. If we, therefore, wish to attend to many details at once, the activity must be judiciously distributed over a large area, *i.e.*, we notice little in each of several objects. Hence keenness of attention will vary inversely with the quantity which we wish distinctly to observe or understand. This we find is actually the case, *e.g.*, we can sharply fix a whole landscape; but then its form alone can be apprehended. We are not surprised, therefore, that under ordinary circumstances we meet with an amount of attention, or neural activity of almost equal degree in every human being.

Lipps roughly agrees with the tenor of this section. "When the vital conditions remain uniform, and during short periods, psychic force may be considered as at least approximately constant, and this constancy may be applied to explain conscious facts" (*Grundtatsachen des Seelenlebens*, 1883, p. 174). Here the agreement ends. Ladd makes primary attention to cover the whole field of consciousness. He says: "Primary attention, essentially considered, is the variously related degrees of psychic energy expended upon the different aspects, elements, and objects, in the one field of consciousness" (*Psychology*, 1894, pp. 74-75). Here, if we are not mistaken, Ladd fails to recognise that the "aspects, elements, and objects," are themselves complexes. Kohn (*Zur Theorie der Aufmerksamkeit*, 1895) holds opinions similar to those of Ladd. Excepting these three writers I recall no others who do not very considerably limit the range of attention. For instance, Ribot (*Psychologie de l'Attention*, 1889, p. 175) contends that if we take men in the mass,

at all. The quantity of detail in all these cases, as can be easily verified, remains the same. Intensity has only regard to the feelings observable in keen attention.

[1] Stewart (*Elements*, 1808, ch. ii.) holds that only the *minimum visibile* can be observed at a time. He thus reduces the field of attention to a point. So Preyer, *Naturwissenschaftliche Thatsachen*, 1880, p. 111: "Only one sensation can be felt at one moment, and that because the attention cannot be divided". See also Wundt, "Messung des Bewusstseinsumfanges," *Phil. Studien*, 1890, and "Zur Frage des Bewusstseinsumfanges," *Phil. Studien*, 1891.

"spontaneous and especially voluntary attention represent exceptional states". So Stout, *Manual of Psychology*, 1899, p. 65: "Attention is simply conation in so far as it finds satisfaction in the fuller presentation of its object, without actual change in the object".

6. *Attention, Felt Strain, Desire to Attend, etc.*—When we speak of effort, or strain, from the strictly psychological point of view, we mean a feeling or set of feelings that indicate the presence of a Need which persists in seeking satisfaction in the face of solid obstacles. The feeling of effort is almost imperceptible in lax attention, and, largely so, in normal attention, because, in these cases, solid obstacles to Needs do not exist or are avoided. Also, when neural functioning is more vigorous, as on account of a spell of extra good health or spirits, we think with less difficulty, and there appears at such times a feeling as if a strain had been removed. When health is precarious, the contrary effect is commonly observed, our thinking being accompanied by a decided feeling of effort. When attention is keen, as in pronounced deliberation, this feeling is also noticeable. The act of intentionally ignoring the surroundings, of turning from the conversation to the book, is accompanied by a distinct feeling of this nature.

When we try hard to remember something, when we wish to rid ourselves of a thought which resists disintegration, when we follow a closely reasoned argument, when we wrestle with a difficult problem, when we think about a subject in the face of distractions, or when we are dead to the solicitations of sense, or, in short, when a Need persists in seeking satisfaction despite of discouragement, this feeling is present in a marked form. We aver at such times that we are making an effort, that there is a feeling of strain, that the mind is active, and so forth. The feeling itself belongs to the class of central or thought feelings, and derives whatever significance it boasts of from the changes which it accompanies. This feeling is by no means a measure of work done. When interest is deep, or when excitement or a strong motive is swaying us, we quickly lose sight of the world around us without noticing any considerable strain. Contrariwise, in the absence of interest, or in low health, there is little work done, while strenuous endeavours of a Need to satisfy itself under those conditions are yet unprofitable and fatiguing.

Sometimes, again, we are unable to make a sensible effort, the Need being balked as when we wish to stay a torrent of irrelevant thoughts and it hurries on undisturbed, as if in mockery. We will decidedly, and there exists a determina-

tion which is unchallenged and persists, yet there is no perceptible feeling of effort, nor any effect as the result of our volition. Effort and change are not related as invariable antecedent and resultant. *Change in what is immediately given may proceed in spite of effort to the contrary—one Need being easily victor over another, effort may be unable to effect a change, and there may be decided willing without any felt effort.* Corresponding to this feeling, but not proportionately, we have on the physical side work attempted or done. After a good night's rest, we are fresh and full of vigour. After a holiday, we return to town reinforced. After a bad night's sleep, we feel tired, and the attention has its point blunted. After prolonged exertion we are exhausted.

Some Opinions.—Bain, *Emotions and the Will*, 1875: "What the will can do is to fix the attention" (p. 370); "in mental attention we can fix one idea firmly in the view, while others are coming and going unheeded" (p. 370). Baldwin, *Senses and Intellect*, 1890: "Attention intensifies a mental state" (p. 72); "the most essential peculiarity of attention is a feeling of *expenditure* which its exercise occasions in mental life" (p. 69). Beneke, *Neue Psychologie*, 1845, p. 142: "What we commonly call the degree of attention bestowed on a sensory content, is nothing else but the relation between the totality of existing traces [or developed dispositions, p. 219] and the number of those which actually enter into the present content". Bradley, "Is there an Activity of Attention?" MIND, 1886: "Attention (whatever it may be besides) at any rate means predominance in consciousness. . . . That which we attend to is said to engross us. . . . We may compare it to the . . . area of distinct vision in the retinal field" (p. 306); "the machinery [of attention] consists of an idea which is able to dominate and so fixes an object connected with itself" (p. 312). Cappie, "Some Points in the Physiology of Attention, Belief and Will," *Brain*, 1886, p. 201: "Attention is the bringing of the consciousness to the focus in some special direction". Dewey, *Psychology*, 1887, p. 133: "The essential characteristic of attention is activity directed towards some end". Fouillée, in *Brain*, 1890, p. 351: "Attention rather makes [sensations] more distinct, qualitatively more differentiated by isolating and protracting them in consciousness". Herbart, *Psychologie*, 1825, § 128: "In its essence attention is nothing but the power of producing an intensification of perception". Hodgson, *Metaphysic of Experience*, 1898, iii., pp. 124-125: "Attention is a reaction called forth or determined by new, prominent, or comparatively vivid feelings, or changes in feeling, and is the note we take of them as features in the current of consciousness as it occurs. It is more than the reaction by which we simply perceive; it is a heightened reaction which is forced upon us by certain perceptions, which we then perceive either in contrast with, or to the exclusion of, others." Heinrich, "Die Aufmerksamkeit," *Zeitschrift f. Psychologie*, etc., 1896, p. 384: "Where the physiological conditions favour the reception of the stimulus, there men say that the impression has been attended to, or has become clear; where the same conditions diminish the effect of the stimulus, there men say that the impression has not been attended to, or has been vaguely apprehended". Höffding, *Psychology*, 1891, p. 315: "It is precisely the gathering of energy round some one idea as the centre of association, that constitutes attention". James, *Psychology*,

1890, i.: "Every one knows what attention is. It is the taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought. Focalisation, concentration of consciousness, are of its essence" (pp. 403-404). "We never make an effort to attend to an object except for the sake of some remote interest which the effort will serve" (p. 416). Kreibig, *Die Aufmerksamkeit*, 1897, p. 2: "Attention is an act of will directed towards making an outer impression or a reproduced idea, or parts of these, clear and distinct". Külpe, *Psychology*, 1893, holds the regulation views. Ladd, *Psychology*, 1894, p. 81: "The distribution of attention depends upon intensity of feeling". Lipps, *Grundtatsachen*, 1883, p. 620: "Attention is no special psychic force, but reproductive activity itself, concentrating, and by means of concentration more able to overcome obstacles". Maudsley, *The Physiology of Mind*, 1876, p. 308: "Attention is the arrest of the transformation of energy for a moment—the maintenance of a particular tension". James Mill, *Analysis*, ed. 1869, ii., p. 364: "Having a pleasurable or painful sensation, and attending to it, seem not to be two things, but one and the same thing". Morgan, *An Introduction to Comparative Psychology*, 1894, p. 189: "We may describe attention as the bringing of something to the focus of consciousness, and the holding it there". Shand, "An Analysis of Attention," MIND, 1894, holds, in opposition to some current views, that attention implies not predominant or clear ideas, but predominant or clearer awareness-of-ideas. Stout, *Analytic Psychology*, 1896, i., p. 181: "What characterises attention proper as opposed to inattention is the singling out of special contents so as to discriminate special objects". Stumpf, *Tonpsychologie*, 1883, i.: "Attention is identical with interest, and interest is a feeling" (p. 68); "the essential function of the attention . . . lies in the prolonged maintenance of an idea in consciousness" (p. 72). Sully, *Human Mind*, 1892, i.: Attention "secures increase of vividness and of definition or distinctness" (p. 77); "it can be dispensed with in proportion as the psychical process grows habitual by repetition" (p. 78); it is to be defined on its subjective side as "mental activity immediately resulting in a raising in point of intensity, completeness, and definiteness of certain sensations or other psychical phenomena, and a corresponding lowering of any other simultaneously presented sensations," etc. (p. 142); "it is a narrowing or concentrating in consciousness" (p. 144); "attention is detention in consciousness" (p. 155). Titchener, *Psychology*, 1897, p. 125: "The idea to which we attend is made clearer, and lasts longer than other ideas". Volkmann, *Lehrbuch*, 1895, ii., p. 204: "To attend to something means: firmly to grasp an idea, a train of ideas, or a presentational mass, and defeat their tendency to sink".

Note on the Above.—The universal opinion appears to be that attention is not co-extensive with thought and action. For my part I find it impossible to agree with such a view, and that for the following reasons. If we take the area of distinct vision by itself without regard to what adjoins that area, we obtain a caricature of reality; for what appears about the focus, though comparatively vague, is still of crucial importance as far as sight is concerned. Indeed, the vagueness is due to the structure of the eye, while, probably, the attention is as much, or nearly as much, engaged with what is outside as with what is inside the focus. For ordinary purposes the *total* field of vision counts, however vague some parts may be. Again: the "distinct" area of vision is in itself but partly distinct, only portions of it appearing in definite outline. This becomes evident when we focus a *part* of some *whole* which we had focussed previously: here some details which had been vague are now

clear, while other details which had been clear have become vague. For these reasons, I am tempted to hold that the focus of vision is equal to the total field of vision, or, speaking more generally, that the focus of assimilation at any time is co-extensive with the total field of assimilation. The ordinary meaning of the word attention frequently covers the whole field of activity. We speak of persons attending to their work, to their lessons, to their duties, to their business, and so forth. When, however, a thing is not attended to, the implication is usually that the attention was occupied with something undesirable. To be inattentive means thus in common speech to attend to any particular object sporadically and carelessly, and not, as I understand it, to attend to nothing at all. Master Scatter-brains and Master Gather-brains are both equally attending without pause, except that the first can overcome insignificant obstacles only, the latter being a giant and the former a dwarf as regards the process of attention. All things considered, then, it seems strange why psychologists who should be free from the popular bias of only observing what is prominent, should have identified attention with a particular and undefined degree of attention. It is as if one should say that only very heavy objects had weight, or that only very strong men had strength, for the so-called special characteristics of attention are characteristics more or less appertaining to all thought and action at every moment and in every part. The fact that human activity is throughout determined by Needs, tends to prove that focalisation, concentration, exclusiveness, insistence, or predominance, are general features, though this does not destroy the notion that there are degrees of attention.

At least for practical purposes it is essential that we should appreciate the bodily aspect of attention. Just as, broadly speaking, men's muscular strength varies only within a moderate compass in the individual and from individual to individual, and that because the organic transformations are equable, so we naturally expect the same to hold of the brain, and consequently of its functions. This is really the case. The only thing measurable which at all corresponds in the sense realm to work done by the brain is, as we saw, the feeling of effort. But this fitful feeling, besides being itself, since it is a feeling, the result of attention, cannot be considered a constant factor in change. In the mind, as ordinarily conceived, we have nothing corresponding to the stable and complex human organism.

Introspection yields nothing for us to measure but the elusive feeling of effort, if we leave aside what is immediately given. Hence we refer to the physical transformations, which we can gauge, to illuminate for us the nature of the process of attention. Strictly speaking, to express ourselves physiologically, *we mean by attention, neural functioning*, or, less concisely, *the expenditure of that portion of the fund of bodily energy which is devoted to neural functioning.* The act of attention expresses such neural functioning and constitutes primarily a process of organic readjustment, as when the healthy

stomach craves for food and obtains it through neural mediation. When we say that we attend, we mean that neural changes are proceeding in a certain direction. Similarly, when we speak of the field of attention, we understand, for our purposes, the field of neural functioning. More generally stated we hold that *in the normal waking state something is always immediately given and that that something is a constant quantity which constantly changes at a constant rate.* The word Attention is throughout this essay employed in the sense here defined (see further § 20).

I speak of neural functioning, so as to exclude activities not specially connected with the central nervous system, *e.g.*, the actions of the liver or the kidneys. At the same time, however, the total fund of bodily energy can only be parcelled out in theory, while motor activity, which has been alluded to more than once, is not fundamentally connected with sensations. The precise physical processes which are covered by the words, "work," "energy," "attention" we leave undetermined, and nothing can be said here as to the precise dimensions of the field of attention or of the rate at which it changes. In the present unsatisfactory state of neurology we naturally decline to commit ourselves to any theory. For a discussion of the subject on the physiological side, see: Bain, in *Brain*, 1890; Bastian, "On the Neural Processes underlying Attention and Volition," *Brain*, 1892; Cappie, "Some Points in the Physiology of Attention, Belief, and Will," *Brain*, 1886 (Reprinted in *Popular Science Monthly*); Dissard, "Influence de l'Attention sur la Perception des Sensations," *Revue Philosophique*, 1895; Féré, "Physiologie de l'Attention," *Revue Philosophique*, 1890; Ferrier, *The Functions of the Brain*, 1885, who says that "intellectual attention is mainly ideal vision" (p. 464), and that "the motor centres are not merely the basis of sensory-motor cohesions and acquisitions, but also the basis of the powers of concentration and control of ideation" (p. 468); Fouillée, in *Brain*, 1890; Hamlin, "Attention and Distraction," *Am. J. of Ps.*, 1896, who discusses the numerous physiological theories; Höfler, "Psychische Arbeit," *Zeitschrift für Psychologie*, etc., 1894-1895; Hylam, "Fluctuations of the Attention," *Ps. Review*, 1896; MacDougall, "The Physical Effects of Attention," *Ps. Review*, 1896; Marillier, "Le Méchanisme de l'Attention," *Revue Philosophique*, 1889; Obersteiner, "Experimental Researches on Attention," *Brain*, 1879; Pilzecker, *Die Lehre von der sinnlichen Aufmerksamkeit*, 1889; Ribot, *Psychologie de l'Attention*, 1889, who states that "attention acts always on muscles and by means of muscles" (p. 3); Sanctis, "Studien über die Aufmerksamkeit," *Zeitschrift für Psychologie*, etc., 1898; Stout, "Apperception and the Movement of Attention," MIND, 1891; Sully, "The Psycho-physical Process in Attention," *Brain*, 1890; Waller, "The Sense of [Muscular] Effort," *Brain*, 1891; and Washburn, "Subjective Colours and the After-Image: Their Significance for the Theory of Attention," MIND, 1899.

7. *Deliberate Attention.* Deliberate attention, together with attention under difficulties, or rapt attention, have generally been confused with attention as such. Suppose that I wish to follow a difficult argument in the book which I am reading. Though I strive to attend, my thoughts, as a matter

of fact, are wandering nearly all the while. I recur to the argument again and again, and swerve off at a tangent almost instantly. We encounter here an ineffectual desire. My wish to attend is only a pious wish, and is not converted into activity in the required direction. On such occasions there may be no felt effort traceable ; we may return to our subject with ease ; and yet leave it, against our intention, in the same manner. Deliberateness of process is in such cases at a discount. We have to persist ceaselessly wishing to attend, because a single resolution does not suffice. Effort is here useless. The wish, again, must not be confounded with the deed. We are really active in other directions, whatever our wish may be.

If the volitional state is said to occasion certain changes, this belief is explicable on the basis of an insufficient induction ; for volition, or an unequivocal resolution, may exist in perfection without influencing the trend of thought. This state is, at best, a fairly reliable sign that a change will take place. Apart from this, its prophetic function, it has only the significance of an item in a series. We might as well argue that the danger signal itself brings the train to a standstill, because the second event usually succeeds the first ; or that trains can only stop when a danger signal is exhibited.

Attention may be successful or telling without the presence of marked strain. A trained musician follows with ease an involved piece of music, which feat he could not have accomplished at an earlier stage of his career, however great the effort. It is not that he is now more eager to attend than he formerly was. On the contrary, he is less absorbed. But though arduous attention has diminished, its desirable effect has increased. Re-attention, by excluding waste of attention, has the virtue of making attention less troublesome, and of enabling us to attend to much with little effort.

Deliberate attention, so-called, is not essentially different from casual attention. Neural functioning is in the former case more preadjusted ; it is more exclusive, or keener ; it is less diffuse. Hence we are more likely to reach a goal quickly. However, the process is still the same in both instances. We are busy with some unfamiliar detail, till, through repeated endeavours, it becomes familiar. Then we are enabled to busy ourselves with a second detail, then a third, until we have at last completed our examination. Attention is strenuously deliberate when it is accompanied by a somewhat more than usually decided notion of an end to be attained. It is action, guided by a rather pressing

Need, or functional tendency, and argues more than normal absorption. In substance, all attention is deliberate, since all thought and action is relational. As I walk along the road my eyes are turned to at least sixty objects a minute, and each object discerned implies deliberate activity. It is a non-organic view which gives rise to psychological word-couples such as habitual-deliberate, voluntary-involuntary, attentive-inattentive.

Opinions on Voluntary and Involuntary Attention.—Baldwin, *Senses and Intellect*, 1890, p. 69: Attention "is the act of holding a presentation before the mind. It is in all cases a conscious act." Drobisch (*Psychologie*, 1842, p. 80) distinguishes between voluntary and involuntary attention, "the former is directed to objects, the latter is attracted by them". Hamilton, *Metaphysics*, 1877, i., p. 237: "Attention is a voluntary act". Herbart, *Lehrbuch*, 1816 (Hartmann's edition), p. 147: "Attention is partly involuntary and passive, and partly voluntary and active". Höffding (*Psychology*, 1891, p. 315) distinguishes between the two classes. Maudsley, *Physiology of Mind*, 1876, p. 312: "It is an obvious distinction to make between involuntary and voluntary attention, the interest of the object or subject forcibly soliciting it in the former case, while it is said to be directed by an effort of will in the latter case". Ribot, *Psychologie de l'Attention*, 1889, p. 3: "There are two well-distinguished forms of attention, the one spontaneous, natural; the other voluntary, artificial". Stout, *Analytic Psychology*, 1896, i., p. 180: "Attention is the self-direction of the mind to an object". Sully (*Human Mind*, 1892, i., p. 164) says of voluntary attention that it "is marked off by a clear idea of end or purpose". Wundt, *Grundriss der Psychologie*, 1896, p. 245: "That condition which is characterised by peculiar feelings and which accompanies the clearer apprehension of any psychic content is called attention".

According to the views submitted in this essay, the characteristics enumerated in the above list are of no more scientific value than differences of stature in human beings. The organic flux in thought and action, by excluding this and including that, necessarily implies "predominance," "fuller presentation," "clearer apprehension, "heightened reaction," "concentration," and so forth. It would be interesting to have it defined when "concentration" or "predominance" are absent.[1]

8. *Attention Has No Focus.*—Normal, as distinguished from keen and lax, attention allows of elaboration without our observing any appreciable strain or noting any restlessness. Imagining this normal strain as a centrally placed point in a line of points gradually thickening from left to right, X . . . Y . . . Z, we obtain towards X a lessening of the strain, and, towards Z, an increase of the strain. The one end like the other is quickly reached. We soon cease to perceive, and we rapidly become incapable of further scatter-

[1] To this Külpe ("Zur Lehre von der Aufmerksamkeit," *Zeitschrift f. Philosophie*, etc., 1897, p. 31) replies: "I cannot recall ever doubting whether in a special instance I was attending or not". We beg to suggest that not casual recollection but conscientious experiment should form the basis of a serious statement.

ing our thoughts. By our very organisation the pendulum of attention ever tends to rest at Y, and this tendency we cannot counteract except by violent means, and then only fitfully. Under normal circumstances, we *must* attend, *must* burn up the normal allowance of fuel, *must* "move on".[1] What we stated implies that there is no precise point which we might call the focus of attention. While writing now, there are some details which I but just distinguish, others which require normal effort, still others demand sensible strain, and still others I do not observe at all. The totality of my present sensations and images is the result or the equivalent of neural processes of a complex character. Throughout life we always, at one and the same time, attend more to some details and less to others. Even in studying the book referred to, some of the energy went into the act of reading. If we try not to attend at all, we are soon forced to attend; and if we make a supreme effort to fix the attention, we only succeed to a very limited extent and for a brief period, and that effort narrows the field of attention proportionately. Details, which we should have perceived normally, escape us, when the limited field of attention is already occupied.

Thus sleep, dreams, delirium, insanity, and other abnormal states, find their explanation in what has been said in elucidating the normal process of attention.[2]

9. *The Larger Waves of Attention.*—The quantity of attention, in the waking state, is, as we have learnt, normally the same always and in all normal persons. It might appear from this that we could at any time attend continuously along one line. This is not so, for protracted thought in one direction tires, though we can freely continue our thought in other directions. In accordance with this we find that

[1] As early as Locke this was recognised. He says: "Hinder the constant succession of fresh [ideas a man,] I think . . . cannot, though he may commonly choose, whether he will heedfully observe and consider them" (*Human Understanding*, bk. ii., ch. xiv., § 15). So Hamilton, *Metaphysics*, ed. 1877, i., p. 247: "We may close our ears or shut our eyes; . . . but we cannot, with our organs unobstructed, wholly refuse our attention at will".

[2] Prof. Hibben has an interesting article on "Sensory Stimulation by Attention," in the *Psychological Review*, 1895, in which he analyses abnormal cases where the attention factor is prominent. Of one case, he writes: "Whenever the subject is one especially interesting to her, she hears without great difficulty; but whenever there is no interest in conversation it is with greatest difficulty that she can be made to hear at all; and it is impossible to gain her attention by any sounds, however loud, if she is engrossed in any absorbing task or play". See p. 370; also Stout, *Analytic Psychology*, 1896, i., pp. 188-189.

in ordinary life the topics of thought change considerably. We also generally tend to pursue a subject only for a limited time if that subject requires much thought, and we incline to recur to it repeatedly rather than follow it without pause. Neural functioning, in conformity with the spatial nature of the brain, or as the result of other neural factors, is broken up into lots. Hence there take place successive changes in various directions, but not continuous ones in one alone. Hence we become tired of one subject, and yet find no difficulty in busying ourselves with other subjects. Hence it is profitable to allow for pauses in our thinking. Instead of imagining attention in time as a smooth sea, we have to conceive of it as a stormy one where the surface consists of huge waves. These waves, which form the ocean of thought, represent the several subjects which constitute the field of attention in time, and the largest waves are constantly broken up so as to allow others to form. Or, we may say that as the blood is propagated, not in a steady stream but in waves, so in attention, or neural functioning, advance proceeds by pulsations.

10. *The Smaller Waves of Attention.*—Yet even this account misses a portion of the truth. The following is, for instance, observable when the attention is turned fixedly to a single aspect of an object. Sometimes, try as we will, we keep on attending afresh instead of attending uninterruptedly, as we desired. At other times we succeed in attending continuously, and then our look develops into a stare, and what we are observing loses all intelligibility. In normal life we ceaselessly pass from detail to detail, for persistent attention to one detail, as in hypnotism, produces vacancy or non-attention. While, therefore, normal attention tends to wander from subject to subject, it also tends to be rapidly moving within the subject from one detail to another. There are, in other words, larger and smaller waves of attention. When we dwell on a subject, we consider the several items of which it is composed. When we study a detail beyond a few moments, a vacuum results. Attention is like a river; it cannot rest; it must report progress. If the larger waves represent the subjects of thought, then the minute ripples which cover the whole surface of the stormy sea represent the essentially dynamic property of attention. Attention, like all work, is movement. At every instant we have to pass onwards, and we halt only as long as there is something for us to do.[1]

[1] As to certain minute oscillations of the attention, as when listening to a just perceptible sound, see especially Münsterberg, *Schwankungen*

11. *Narrowing the Normal Field of Attention.*—Though the field of attention has ordinarily its complexion changed through subjects being displaced slowly and points in a subject rapidly, yet a different condition is by no means unknown within the sphere of human action. Here is an illustration. It is some time since I have visited a certain friend. As I enter a street near that friend's house, I see his terrier who used to accompany me on rambles. I shout across the road "Cæsar". The dog instantly turns. His head and neck, his limbs, his tail, his whole body, in short, appear rigid and motionless. His eyes are vacant. His breathing, I suspect, has almost ceased. After a few moments the eyes suddenly brighten, the body becomes a volume of living springs, and the dog bounds over to me. I am recognised by him. My voice apparently struck some familiar chord, for else he would have taken no notice of my call. His whole being, we may say, was sucked into the whirlpool of a known voice. The available attention, under these exceptional circumstances, was centred on one detail. From his stiffness and his blank gaze, it was clear that all central activity, except that of deciphering my personality, was absent. His eyes, his ears, his nostrils, his imagination, struck work. Energy was sorely needed in one direction, and was, therefore, withdrawn from the other directions.

In this instance the field of immediately traceable activity was reduced almost to zero. There was not merely an exchange of one field for another; but the second field had almost no dimensions. The attention machinery, which would normally produce a certain quantity of immediately traceable detail, was working subterraneously. We meet here with purposive vacancy. Compared with ordinary thought, we miss subject, points of subject, and sense elements. Otherwise there are but confused feelings to make up for the extraordinary shrinkage of the view; perhaps even these are absent. It is a narrowing of the traceable field of attention with a corresponding reduction of traceable activity.

Such shrinkage is produced on various occasions, notably: (*a*) when we are trying hard to recollect something; (*b*) when we put a difficult question to ourselves and insist on obtaining

der Aufmerksamkeit, Beiträge, 1889, Heft ii.; also Hylan, "Fluctuations of the Attention," *Psychological Review*, 1896 and 1898; Urbantschitsch, *Pflüger's Archiv*, 1881 and 1882, and *Centralblatt f. d. Med. Wissenschaft*, 1875; Cook, "Fluctuation of the Attention to Musical Tones," *American Journal of Psychology*, 1899; and, in Wundt's *Phil. Studien*, Lange (1887), Eckener and Pace (1892), Marbe and Lehmann (1893).

an answer; (*c*) when we attempt to grasp an intricate problem, as in the case of understanding what we read; (*d*) when we wish to think of a subject under unfavourable circumstances as in ignoring the conversation; (*e*) When we slip into bed, close our eyes, and make ready for sleep; (*f*) when we are subjected to long-continued and monotonous stimulation, as when the hypnotic state is induced; and, lastly, (*g*) when we are on the *qui vive* as regards some matter, as in endeavouring to hear whether a nightingale is singing in the distance. In all these instances our neural system is like a stretched elastic band which has a strong tendency to return to its normal condition. If we persist in such an attitude for more than a few moments, we invite headache and dizziness. Usually, therefore, our attempts are consecutive; but even then frequent trials, at short intervals, to narrow the field of attention defeat themselves.

12. *Expanding the Normal Field of Attention.*—The normal field of attention may be narrowed. May it also be expanded? That does not appear possible. Suppose that we desire to observe all that is passing around us. We act accordingly, and we soon learn that no appreciable growth of the field of attention has taken place. What happens is that we quickly fly from detail to detail, the peculiar excitement favouring retention of what is observed. It may be, however, that excitement induces a more than usually voluminous and rapid flow of thought.

13. *Observation and Attention.*—The limited quantity of bodily energy which can be devoted to neural functioning, explains the varied quality of observation, both inner and outer. A man lives in the country, and scarcely knows the shape of a single kind of leaf. Raising my eyes, the sycamore tree under which I write is guessed at rather than seen, while the other trees in the background appear still more indistinct. I meet with considerable difficulty in discerning a single leaf in full, for in most directions I can only see shapeless green patches. In a few places alone, though I am but some feet off, can a leaf be clearly distinguished. To observe a leaf unmistakably, means that we observe it in preference to others, that we assimilate its structure, its size, its form, its colour, and the relation of each of these to one another and to the whole. Besides, the shapes vary somewhat, as with the ivy, for instance; they also differ with the season in colour and size; and caterpillars, and sundry other factors, give rise to additional changes. If we wish to know more of the leaf, we must, in a critical manner, compare it with other leaves. Usually there is no attempt

to attend carefully to any object; for, in the instance we cited, such attention would imply that we stood still, that we procured a convenient number of leaves, and that we scrutinised them until we had satisfied ourselves as to the nature of the normal leaf. Glancing at trees in passing is inadequate for such purposes.

As I walk down a lane at the end of June I note a wealth of grasses and flowers along the roadside; but no glimpse can give one a reasonable notion of even a single blade. As the average person observes superficially, it follows that he has a scanty knowledge of botany and of things in general. He usually glances at the shape or colour of some leaf, and forgets it as quickly.

In seeing a small square □, we see something primarily given in space. But with the majority of objects, time enters as a salient factor, *e.g.*, a daffodil is a continually changing object, and to understand this flower we must observe in due order the changes through which it passes. Fresh knowledge can only be acquired by strenuous endeavours, and when we neglect to be strenuous, what is before us remains imperfectly known to us. If the outline of a tree strikes me as familiar, I already know something of that tree. If I can tell the name, size, shape, colour, structure, function and development of its leaves, branches, trunk and roots, then I know just a little more, that is all. There is only a question of degree in attention, or in the result of attention—knowledge. From the standpoint of attention there are ever higher syntheses; and, similarly, lower and lower. The vaguest feeling varies only in complexity from the most elaborate conception. We are constantly passing up and down the ladder of knowledge. The wildest dream, in its several portions, has consistency; and the most careful thought has simply more of this consistency.

14. *Attention to One Object at a Time.*—We have seen that the normal amount of attention is constant. We have learned how familiarity in one direction allows of additional functioning in other directions. We observed also that attention does not deal so much with points as with fields. Hence we answer the question, "Can we attend to more than one thing at a time?" with a decided "Yes".

Indeed, there cannot be a one thing to attend to. All functioning implies breadth and plurality, and the field is not even limited to one notion or one act. While I endeavoured to understand what I was reading, I was, of course, reading at the same time. The latter claimed some of my attention,

and I was thus active in two sets of directions. I might have been reading the passages aloud, and walking while thus reading. In addition I might have been playing with a key in my pocket, and so forth. The field of attention is only restricted by the quantity of labour requisite for an act. *Various activities are pursued, separately or conjointly, as easily as one, if those activities collectively absorb no more than the normal amount of energy.*

The attention is usually divided, as in the instance just referred to. It seems possible to speak as fast as one can, while, at the same time, reading an announcement on a street hoarding, and inwardly contemplating a landscape. Again, in any simple performance a multiplicity of actions are carried out simultaneously. In lifting a heavy weight, I do not need to choose first a convenient position, then stand firm, then adjust my hands and fingers, and then exert a strain. Many of the various movements are normally performed at one and the same time. The subdivisions of such an action can be again subdivided, if need be, for there is scarcely a common movement so simple as to lack parts. We, therefore, find, as we might have anticipated, that, in learning, we generally proceed only with portions of a process at a time. After a period several portions are performed simultaneously. Sometimes, as in the case of lifting a weight, the activities form one connected whole. At other times, they are disconnected: the walking has nothing in common with my playing with the key, and my playing with the key is not thought of in connexion with my reading aloud.

Let us remember what we have already referred to, that the functioning of the central nervous system is due to the pressure of organic Needs, or to functional readjustments. For this reason, if what we are busy with requires less than the normal energy available, series after series will establish itself until the available energy is fully employed. Hence when we are engaged in routine occupations of a low order, *i.e.*, occupations which absorb little attention, we always add to our immediate *répertoire* of thought or action. As a difficulty in the work arises, so the matters attended to decrease; as the work becomes easier, so we are busied increasingly with what is not connected with the task. In some matters alone do we encounter the fact that we cannot do more than one thing at a time. I cannot, for example, sit here writing, and be, at the same time, strolling through the neighbouring wood. Such instances, however, prove little. Only a few days within first writing this, I overheard a remark illustrat-

ing the view which is here put forward. Some builder said slightly sarcastically to one of his men, as I was passing by, "You wouldn't do for a carman; you would pull up the horse every time you wanted to speak," plainly intimating that the man might do his work and talk at the same time. Of course, an untrained psychologist would be confused if he attempted to do deliberately what he constantly does without pointed deliberation. But time will soon prove to him that introspection is not bound to be a barrier to the direct observation of immediately traceable facts. As practice proceeds, he will be able to institute an "introspective series".

The problem involved in this section has been much debated. Brentano (*Psychologie*, 1874, pp. 204-232) holds that several things can be thought of at once, but they must form one whole. Hamilton (*Metaphysics*, 1877, i., p. 254) contends that five or six points can be discerned simultaneously. James (*Psychology*, 1890, i., pp. 405-409) seems to me ambiguous. Lipps (*Grundtatsachen*, 1883, p. 164) believes that "only one process of thought can proceed at a time without interruption". Paulhan ("La Simultanéité des Actes Psychiques," *Revue Scientifique*, 1887) recounts a number of most interesting experiments of his own which tend to prove our contention. Stewart (*Elements*, 1808, ch. ii.) considers, as we have seen, that the *minimum visibile* is the time-atom of thought. Stout (*Analytic Psychology*, 1896, i.) concurs with Brentano and Lipps, saying, in explanation, that "each mode of mental process tends to arrest and suppress others" (p. 196), a conclusion which I cannot agree to. The fact that effective introspection is generally denied, implies that thought is considered only one storey high.

15. *Do We Attend in Habit?*—This is not the place to face the question of routine: we have done that in a previous essay (MIND, October, 1899). We can here only consider the problem from the standpoint of attention. Take as an illustration the compositor who is setting up this type. If he is not introspective and he is asked how he does his work, he will be unable to recollect more than a minute portion of the process. Why is that? It is because he does not, now, at least, think of the different parts of the process as a whole and in relation to other things. He only regards the steps in connexion with the immediately preceding and following ones. Through continued improvement he has become an adept at doing the right thing at the right time. Being uninterested in the nature of his work and interested in other things, there is a tendency to crowd out of the total process whatever can be spared. He busies himself with that only which he is compelled to do, being employed otherwise in reflecting over pleasanter, and to him, more fascinating themes than setting up type. The gathering thoughts push aside all that they dare. As a result, attention to the work is reduced to a minimum. He just remembers what is

necessary—no more and no less, roughly speaking—and what is not necessary falls a prey to oblivion. Each move is involved in the one which precedes it—it being immaterial here whether the stimulus is central or not—and is entangled in the following move, and so on. As these moves are of no general interest, as attention to them is minimal, and as the main stream of thought rushes by them, they become lost to the memory under ordinary circumstances. Assuming that the compositor has duly learnt his art, his acquisitions, through economising the attention, are reduced to what is indispensable. That he attends to his work is plain. He selects from many letters in a box, the one which lies in a certain position. Previous to that selection his right arm moved towards the proper box. If he shut his eyes, he would soon find out their uses; if he then lost the sense of touch, he would be unable to proceed. Sensations, images, and movements, are the result of attention, and since they occur in the process, the compositor must be attending. Or, to test the matter differently. If the compositor is so inclined, he can observe what he is doing, and thus remember the various steps in order.[1] In noting his own procedure, he will soon be convinced that he is busy attending during the whole process. Again, let the compositor be interested in a conversation, let that grow to be absorbing, and his arms gradually come to a standstill, which proves that attention covers the whole field of organic functioning. No process is so elementary that it escapes falling under this rule.

16. *Can We Attend to Habits?*—A misconception has been created by the opinion that it is not possible to attend to a habit without influencing it. Only casual observation bears that out. It is true that with some activities the first attempts at following the process modify it or give rise to perplexity. More critical study, however, shows that the embarrassment soon disappears, and that after prolonged practice we can fully observe without in the least degree introducing any change. At first, in following the process, we incline to divert the labour requisite for the process itself. Hence disorder. We are also apt to introduce crude notions, or deliberately fix our eyes instead of allowing them free play;

[1] Stewart (*Elements*, 1808, ch. ii.) believes that we attend in habit, only that our thought is much quicker. Stout (*Analytic Psychology*, 1896, i.), with the majority of psychologists, excludes attention from the realm of habit. He holds that "independence of attention" is one of "the chief features of permanently fixed habit" (p. 258); that "established habit is independent of and exclusive of attention" (p. 261); and he tells us further that "a practised reader does not usually attend to the letters and words; his thoughts are occupied with the meaning" (p. 206).

and the like. But as we continue striving to attend to the manner in which we perform a task, less labour is wasted or misdirected, and the two processes of performing a task and of attending to the manner of performance proceed together. In some instances, besides, it is essential that we "attend" to our work. In others, we freely attend to our dress, to our looks, to our walk, or to our conversation, *e.g.*, we not only converse, but we take note of how we converse.[1]

17. *Conditions Favouring Attention.*—We discussed at length the meaning of attention. A few words suffice to fix on the conditions which favour attention.

(*a*) First and foremost in stimulating attention, always taking for granted the existence of Needs, *i.e.*, of functional tendencies, is the presence of an irresistible inclination to attend. A certain quantity of attention perpetually strives to spend itself. Be the interest ever so low, if we are not otherwise occupied, every trifle is likely to enter the avenues of sense or of the imagination. What would otherwise not be attended to receives recognition, because we must be occupied somehow. When for any reason, as on occasion happens, we have nothing special to busy our thoughts with—nothing that stimulates to marked endeavour—then a long caravan of thoughts travel across the pasture lands of fancy, each one of which, as soon as it requires the slightest effort, is displaced by other thoughts of a similar ephemeral nature. Everything in turn then captivates the inner and the outer senses. The completion of a thought, in those circumstances, depends on the ease of pursuing it; and as difficulties are bound to arise in the process, each thought, in the case we are considering, tends to be abruptly displaced. As birds lay eggs whether these are fertilised or not, so we continue thinking whether there is a present necessity or not. Since some difficulty might have to be solved at any moment, the attention does not slacken. When thinking is not compulsory, our thoughts lack the germ out of which other thoughts evolve. These are the unfertilised eggs which the bird of fancy cannot help laying.

(*b*) In the next place comes the precise quantity of available attention, as distinguished from its perpetual presence. The latter determines that we shall be active; the former decides how far we shall be active. Thus as routine generally lays claims to but little of the available attention, we have rising tier after tier of thought until the demand equals

[1] Stout (*Analytic Psychology*, 1896, i.) strongly maintains that in attending to habit, "habit is disturbed; there is loss of facility, rapidity, and uniformity" (p. 261).

the supply. As the dog pretends to be anxious to fetch a stick out of the water when his desire is to bathe, so we often make believe that we are busy with many details when we are hurried along by the imperative necessity to continue acting.

(*c*) Just as before going to sleep we frequently doze, attention being on the decline; so ill-health tends often to decrease the energy available for functioning. This usually expresses itself in two ways. First, we attend less absolutely. Secondly, the value of an effort is largely reduced, so that no suggestion is pursued to its legitimate issue. In robust health, on the contrary, attention is at its maximum both as regards strenuousness and effectiveness. Hence, other things being equal, attention is most effective in good health.

(*d*) In our analysis we noted that unfamiliarity offers a barrier to voluminous attention. While the flowers and grasses along a lane are meaningless to one individual, to another, a botanist, they yield a rich harvest of knowledge. This man recounts a score of floral species which he observed, with much other information, while the former cannot distinctly recall anything. What is most easily attended to, is that which has been attended to strenuously on former occasions. As a magician's wand was said to rear a castle in a moment, so attention, with bewildering swiftness, utilises the bricks and mortar of memory. It sorts, sifts, distinguishes, classifies, and recognises, a variety of details in a very brief space of time. Attention is, therefore, most effectively employed on what it has been engaged upon before.

(*e*) For practical purposes it would not be enough just to re-cognise, to re-attend. Re-attention is most useful when it is combined with simple attention, or, at least, with attention to something not well recognised. When the comparatively new is involved in the comparatively old, the consequences are most fruitful. In proportion as the new is isolated, so will it be difficult to make it a permanent possession. Thus when new truths stand by themselves, they are hard to assimilate and remember, while, if they are shown to be part of an old truth they are often reinstated or comprehended with the greatest ease. For the advancement of knowledge—for effective attention—nothing is more valuable than to show the old in the new.

(*f*) What is conveniently grasped, other things being equal, is also more conveniently attended to. If an object exhibits a special design; if the parts are co-related; if its scheme is

not fantastic ; if it is not so small or so large that much effort is required in its examination ; if it is of a class known to us, then we readily busy ourselves with it. Thus a fine mansion is easily conceived of as a whole ; thus a name encountered for the first time is yet fluently read by one accustomed to reading ; thus a geometrical figure of regular proportions is not as exhausting to take note of as one of irregular proportions ; thus a picture representing a scene from human life is understood the more readily the more evident the relations of the figures.

(*g*) *The business of the attention, i.e.*, the business of the central nervous system, *is to serve the organism*, and in this sense attention is teleological. Some demand of our nature, muscular or neural, nutritive or regulative, sets the brain going and, if advisable, keeps it going until the demand is satisfied. Then another want acts as a stimulus, and so forth. This is an abstract manner of regarding the matter. We have normally several wants engaging the attention simultaneously ; and, as a rule, the want absorbs the attention for a time only, and not until it is satisfied. If a man is fond of strawberries and they are before him, his attention, or part of it, will probably be devoted to the strawberries until he has done with them ; but if they are difficult to procure, a little speculation is all which is ventured upon. Our wants are also frequently complex : a man goes for a walk, for instance, because he desires exercise, fresh air, the music of the birds, and the sight of flowers. The purpose of neural activity is to satisfy our primary and other Needs ; but when we are specially eager about one matter, the whole available attention is concentrated on that alone.

(*h*) When interest is acute, attention is highly effective without any strain being perceived, though the consequences often show that such strain existed ; when interest is slight, attention is comparatively ineffective, while the related effort of attention is distinctly felt. In interest there is a rush of available energy towards a certain point.

(*i*) When interest, for any reason, is absent, *ennui* sets in. We then long to do something. We are uneasy as the result of being unemployed. Adults, under such circumstances, yawn and languish, while children cry for something to do. In *ennui* the attention is largely absorbed in uneasiness, as there is no sufficient incentive to make use of it through the accustomed channels. The existence of *ennui* proves, in addition, that the tendency to action is constant, and not solely determined by the presence of this desire or that.

(*j*) An important aid to continuous attention is to dismiss decidedly and completely the previous thought, and to turn whole-heartedly to the matter to be attended to. If that be fairly interesting, the attention will then easily be sustained, and quickly recur to the subject in the case of momentary absent-mindedness. Much of children's inattention is due to their difficulty of ridding themselves effectively of thoughts which precede, or arise out of, the lesson.

When I sharply dismiss a thought, I do it usually by shutting my eyelids forcibly; by looking emphatically at some object, or by some other *abrupt muscular* act. The only alternative is to refuse to think, when after a little while some casual percept or idea emerges. In any case, dismissal seems due to change of activity alone. It is as if we could only dismiss visitors by inviting others to take their place.

(*k*) The more the attention is trained, and the more we can appeal to some congenital or acquired predisposition, the more readily are we active in any chosen direction.

18. *The Education of the Attention.*—What has been remarked concerning the conditions which favour attention must be had regard to in education. There are at least three principles to be taken account of.

(*a*) The attention should be deliberately exercised. No tasks requiring either no sensible effort or a great effort should be, as a rule, imposed; for in both instances the labour is almost wasted. Supposing now that the exercises are rational, we shall discover that what at one time could not be done at all, can later on be readily accomplished. After appropriate practice we glide at will from subject to subject, or row deliberately among the shallows and deeps of one thought. In the education of the attention it is of prime importance to prevent aimless thought, and to enable us firmly, freely, and fully to fix our attention on any subject we choose. It is not sufficient for us to be trained in certain directions, as mathematics or languages. If no more is done, vast tracts will remain uncultivated. Education must enable the individual to control his activities generally, or rather aim at perfecting, as a whole, the neural mechanism.

(*b*) The motive for attending must be detached from special interests, and the supreme notion to plant in the child, as regards attending, is to make it desirous of acting effectively. In other words, the child must be brought to have a strong inclination in favour of properly attending. The Need for reasonable effort should be the incentive. The employment of the attention must be dissociated from the interest in the thing immediately attended to. In all sound reflexion there is readiness to attend to what is not

specially interesting except as a means to some remote end.[1]

(*c*) The training of the attention must begin early in life. Later results are most disappointing.[2]

19. *Factors Producing Changes in the Field of Attention.*—Changes in the field of attention are mainly induced by one of the following circumstances: (*a*) when attention has attained its end (Stout); (*b*) when fatigue sets in (Stout); (*c*) when a strong sensation competes (Stout); (*d*) when through lax or overwrought attention the topic tends to change; (*e*) when a new or old topic recently thought of, commandeers the attention; (*f*) when a word, a tune, a sentence, etc., haunt us; (*g*) when we are full of anxiety; (*h*) when attention was due to a mood which is receding; (*i*) when we attend to various objects alternately; (*j*) when we dismiss a thought deliberately; (*k*) when a thought shows signs of tiring, and is not of pressing importance; (*l*) when we have given sufficient attention for the time being;[3] (*m*) when in a subject or in our surroundings we gather something of special interest; (*n*) when some routine duty is to be performed; (*o*) when, by previous resolution, we are to do something at a stated hour—or on encountering something or somebody; and (*p*) when a feeling of hunger, etc., becomes imperious.[4]

20. *A Bird's Eye View.*—The term most intimately connected with attention is direction. In attention, therefore, regarded physiologically, we consider the play of neural changes from the point of view of the direction in which they take place. It is not so much change, as the line-of-change, which we refer to in speaking of attention. In this sense the present essay deals with a certain aspect of cerebral change—with the reasons why neural change tends now in this direction and now in that. Again. Since normal activity is liable to interference and has certain characteristics, we speak of the degree and the volume of attention.

[1] The Associationist school lays the stress on feeling, interest, or pleasure-pain; the Herbartians, on connecting what is new with what is old.

[2] On the subject of the training of the attention, see Carpenter's *Mental Physiology*, 1876, ch. iii.

[3] We usually devote only a short period at a time to any particular problem.

[4] "Attention in any given direction ceases only under one or more of the following conditions: (1) when its end is attained . . .; (2) when fatigue sets in; (3) when some competing sensation . . . interrupt[s] it; (4) when some sensation or image occurs connected with a system of psychical dispositions which . . . happen to possess . . . a relatively high degree of excitability;" *i.e.*, casual associations (Stout, *Analytic Psychology*, 1896, i., p. 197).

Attention thus treats of the direction, the degree, and the volume of cerebral change. It embraces all activity; its field is the field of activity. Thus the word attention is useful as is the word direction. It helps us to express the fact that the brain is busy in this direction and not in that; that its forces are massed here and not there; and that in the normal waking condition it functions incessantly, to the same extent, and in varied directions.

From this position it is but one step to a looser use of the term where it sometimes only spells activity or change. Thus when we say that we attend in a certain direction, we mean that we are active in that direction. In this wise attention has come to be identical with change and change with attention. In the strictest sense, then, our subject has been the systematic aspect of neural functioning.

We have identified attention with cerebral change. The meaning of our key-word is readily distinguishable from the only other term, besides activity, with which it might be confounded. Willing is divided from attention, and attention from willing, in that attention *always is* change and nothing else, while volition *never is* change, but only points to it. The relation is that between being and becoming, between *sein* and *werden*.

Viewing the subject of attention from a still higher position (which embraces the physiological aspect), we say that *in the normal waking state something is always immediately given* and that *that something is a constant quantity which constantly changes at a constant rate*. Here the terms attention, activity, functioning, and energy, become superfluous. In our exposition, however, we have found it impossible to break with the old terminology without endangering the sense and making comparison difficult. Nevertheless one feels that it is most undesirable to assume some mysterious power or capacity along with what is immediately given; for such a power or capacity describes nothing and explains nothing, and has, therefore, no place in science.

21. *Applications.*—The fruitfulness of the principles for which we have contended, is such that it is impossible to deal with the numerous offspring within the limits of an article. Already one application has been made in explaining the nature of habit, in MIND, 1899. Further applications might be made which would assist in elucidating the psychology of æsthetics, of the memory, and also of dreams, hypnotism and related states.

Additional References.—Angell and Pierce, "Experimental Research upon the Phenomena of Attention," *American Journal of Psychology*,

1892; Angell, "Habit and Attention," *Psychological Review*, 1898; Angell and Moore, "Reaction-Time: A Study in Attention and Habit," *Psychological Review*, 1896; Cattell, "Aufmerksamkeit und Reaktion," *Phil. Studien*, 1892; Darlington and Talbot, "Distraction by Musical Sounds," *American Journal of Psychology*, 1898; Drew, "Attention, Experimental and Critical (with Bibliography)," *American Journal of Psychology*, 1896; Dwelshauvers, "Untersuchungen zur Mechanik der activen Aufmerksamkeit," *Phil. Studien*, 1890; Griffing, "On the Development of Visual Perception and Attention," *American Journal of Psychology*, 1896; Martius, "Ueber die musculäre Reaktion und die Aufmerksamkeit," *Phil. Studien*, 1890; Moyer, "A Study of Certain Methods of Distracting the Attention," *American Journal of Psychology*, 1897; Swift, "Disturbance of the Attention during Simple Mental Processes," *American Journal of Psychology*, 1892; Uhl, *Attention, a Historical Summary*, 1890.

V.—CRITICAL NOTICES.

A Critical Exposition of the Philosophy of Leibniz, with an Appendix of Leading Passages. By Bertrand Russell, M.A., Fellow of Trinity College, Cambridge. Cambridge: At the University Press, 1900. Pp. xvii., 311.

The exposition of Leibniz's philosophy is peculiarly difficult, because of the mass of material and the gradual way in which it has become available. One must appeal for some guidance to earlier commentators, and the value of the commentary depends not merely on the skill and accuracy of the commentator, but on the amount of Leibniz's writing that was accessible to him when he wrote. The *Discours de Métaphysique* and the correspondence with Arnauld were not published when Erdmann wrote his exposition, and it seems to Mr. Russell that their importance as throwing light on the real foundations of Leibniz's philosophy has not been sufficiently recognised by later writers. Mr. Russell tells us that the reading of these writings enabled him to see "how the foundations of Leibniz's philosophical edifice were laid and how its superstructure rose out of them. It appeared that this seemingly fantastic system could be deduced from a few simple premisses, which, but for the conclusions which Leibniz had drawn from them, many, if not most, philosophers would have been willing to admit." And the result of his investigation is, he thinks, to show that "Leibniz's value as a philosopher is very much greater than that which would result from the customary expositions". Mr. Russell's book as a whole, however, leaves one with the impression that the value of Leibniz as a philosopher is mainly of a negative kind, and that the chief service of his philosophy is to provide materials which enable an acute critic to show that certain principles, accepted by Leibniz as well as by "many, if not most, philosophers," are really inconsistent with one another.

Mr. Russell's method, then, is purely logical, as distinct from historical. His object is not to expound Leibniz's doctrine in its historical relations and to estimate its value with reference to other systems, but to examine its direct logical worth. Accordingly, instead of beginning, as is usual, with Leibniz's Monadology, he examines in the first place the logical principles of the system. The direct consequences of these principles raise the problem of the nature of matter, and Leibniz's philosophy of matter leads to the conception of the Monad. These three subjects are discussed

in the first eleven chapters of Mr. Russell's book, while the remaining five chapters deal with the problem of soul and body, theory of knowledge, and the doctrine of God and ethics. "In these last chapters we shall find that Leibniz no longer shows great originality, but tends, with slight alterations of phraseology, to adopt (without acknowledgment), the views of the decried Spinoza." Leibniz's views on these matters are accordingly more briefly treated than "the earlier and more original portions of his reasoning". It would be difficult to speak too highly of the skill and accuracy with which Mr. Russell has laid bare the logical articulation of Leibniz's system, although the cleverness and minuteness of the analysis make one feel that the logic is somewhat clearer to the expositor than it was to the author. But the combination of criticism with exposition makes the book a hard one to read. It is one of the inevitable disadvantages of any purely logical study of a philosophical system that the critical expositor (whether or not he is clearly aware of it) must expound and criticise from a logical standpoint of his own, with the result that the author sometimes gets less, and sometimes more, than justice. Usually, however, the reader, knowing the expositor's point of view, can make a rough allowance for "windage". But Mr. Russell has a logic of his own which he indicates from time to time, but which he nowhere fully expounds and justifies. This adds greatly to the difficulty of understanding and discussing his book. It would no doubt be absurd to complain that Mr. Russell has not here given us a full exposition of his own principles; but the task of the reader would have been considerably lighter if (for instance) Mr. Russell had somewhere told us what he means by a "proposition".

Mr. Russell finds that there are five principal premisses of Leibniz's philosophy, some of which were "definitely laid down by him, while others were so fundamental that he was scarcely conscious of them". These five premisses are: "(1) Every proposition has a subject and a predicate. (2) A subject may have predicates, which are qualities existing at various times. (Such a subject is called a *substance*.) (3) True propositions not asserting existence at particular times are necessary and analytic, but such as assert existence are contingent and synthetic. The latter depend upon final causes. (4) The Ego is a substance. (5) Perception yields knowledge of an external world, *i.e.*, of existence other than myself and my states." "The fundamental objection to Leibniz's philosophy will be found to be the inconsistency of the first premiss with the fourth and fifth: and in this inconsistency we shall find a general objection to Monadism" (p. 4). Mr. Russell proceeds to summarise the argument of Leibniz, by which, from the first four premisses, together with the empirically assumed fifth, the doctrine of Monads is reached. To summarise this excellent summary is impossible, and it is too long to quote. I shall therefore make some notes on Mr. Russell's criticism of the

positions implied in it. He begins by denying that all propositions are reducible to the subject-predicate form. "The plainest instances of propositions not so reducible are the propositions which employ mathematical ideas. All assertions of numbers, as, *e.g.*, 'there are three men,' essentially assert plurality of subjects, though they may also give a predicate to each of the subjects. Such propositions cannot be regarded as a mere sum of subject-predicate propositions, since the number only results from the singleness of the proposition, and would be absent if three propositions, asserting each the presence of one man, were juxtaposed" (p. 12). Besides there are "relational judgments," expressing a "relation" which "is something distinct from and independent of subject and accident". Leibniz recognised these, dealt with all the main types of them, and endeavoured to reduce them to the subject-predicate form. Relations and aggregates, according to Leibniz, have only a mental truth. But they are not groundless or unreal. In the case of a supposed relational proposition, "the true proposition" (as Mr. Russell expresses it), "is one ascribing a predicate to God and to all others who perceive the relation". Now Leibniz admitted that there are relations which are not reducible to qualities of one or other of the things related, and, if these relations are perceived by God, then either God perceives something which is not a proposition (not having subject and predicate) and is therefore meaningless, or there are relational propositions, which are true independently of His perception. Mr. Russell proceeds to point out that "judgments of subject and predicate are themselves relational, and include, moreover, as usually understood, two fundamentally different types of relation. These two types are illustrated by the two propositions: 'This is red' and 'red is a colour'" (p. 15). This contention Mr. Russell does not further justify; but apparently he holds that all propositions are "relational" and that in an ultimate analysis they cannot be shown to have a subject and a predicate. Both the predecessors and the successors of Leibniz, however, are at one with him in believing that "propositions must, in the last analysis, have a subject and a predicate". And Mr. Russell roundly declares that "any philosophy which uses either substance or the Absolute will be found, on inspection, to depend on this belief". "Philosophers have differed, not so much in respect of belief in the truth of the doctrine, as in respect of their consistency in carrying it out" (p. 15).

We have here, then, a criticism not merely of Leibniz's philosophy, but of the fundamental principles of all the great modern systems. It is a pity that in making so comprehensive a charge Mr. Russell has not given us a more complete account of his own position, for if his contention be just, his relational theory of the proposition must be of incalculable importance in philosophy. If every philosophy "which uses the Absolute" is to go down before it, the theory can hardly be explained too fully or argued

too thoroughly. Yet Mr. Russell leaves us in uncertainty about a great many important points. So far as I understand his position, it is based on the contention that the category of relation cannot be reduced to that of substance and accident, that there are relations which are not qualities either of a single all-comprehensive substance or of one or other of a plurality of substances. So far his criticism of Leibniz seems just. But when he extends the criticism to Leibniz's successors as well as his predecessors, it must be pointed out that it has meaning only against those who use substance and accident as the highest category. Mr. Russell's argument implies that there is no form of the subject-predicate view of the proposition which is not bound up with a substance-accident view of the world, a monism or a monadism of substance. But is this really the case? It is certainly not self-evidently so: otherwise Kant and his successors could hardly have imagined that they were transcending the substance-accident view of the world, which had been the foundation of preceding systems. Mr. Russell faces this difficulty. He gives us a new account of the meaning of Kant's Copernican revolution. "A large part" of this revolution, he says, consists in the view "that propositions may acquire truth by being believed" (p. 14). This somewhat startling statement is explained by a theory which Mr. Russell propounds in chapters xiv. and xv., where he contends that truth cannot depend upon knowledge, because "knowledge is a complex conception, compounded of truth and belief" (p. 182). "As a psychical phenomenon, a belief may be distinguished by its content, but not by the truth or falsity of that content. Thus, in discussing knowledge, *i.e.*, the belief in a true proposition, we presuppose both truth and belief. The inquiry is thus hybrid and subsequent both to the philosophical discussion of truth and to the psychological discussion of belief" (pp. 160, 161). A proposition, then, is always one thing, and a knowledge of the proposition is another. And the proposition is always prior to any knowledge of it. Accordingly Mr. Russell argues against the "view commonly held that, as Leibniz puts it, the eternal truths would not subsist if there were no understanding, not even God's. This view has been encouraged by Kant's notion that *a priori* truths are in some way the work of the mind, and has been exalted by Hegelianism into a first principle. Since it is self-contradictory to deny all truth, it has thus become self-contradictory to deny all knowledge. And since, on this view, nothing can be true without being known, it has become necessary to postulate either a personal God, or a kind of pantheistic universal Mind, from whose nature truths perpetually flow or emanate" (p. 181). Evidently, if Mr. Russell's account of the relation between knowledge and truth is correct, the Kantian revolution is reduced to absurdity, and the highest category (whatever it may be) cannot be mind or self-consciousness or anything that suggests knowledge. For truth is represented as essentially independent of all knowledge,

though in some unexplained way it comes, by being believed, to be an element in the constitution of knowledge.

Is Mr. Russell, then, right in his view of truth and knowledge? I have tried hard to understand what can be meant by a "truth" which is entirely independent of knowledge, a "proposition" which no one believes or disbelieves (for to disbelieve is to believe the opposite, and there is knowledge in either case), and I must confess that I have failed utterly. As it appears to me, Mr. Russell's argument amounts to an assertion, not indeed of things-in-themselves, but of relations-in-themselves. For apparently all propositions are relational and all true propositions are prior to knowledge. Such a view seems to me to be open to most of the objections that may be adduced against a theory of unknown things-in-themselves, while it has in addition certain difficulties of its own. For instance, when Mr. Russell speaks of knowledge as "a complex conception, compounded of truth and belief," does he mean that knowledge is a psychical phenomenon, like belief, or that it is a "conception" as distinct from a psychical phenomenon or that it is a compound of both? If it is merely a psychical phenomenon, how does it differ from belief in general and how are we entitled to define it as *truth* plus belief? If it is a "conception" as distinct from a psychical phenomenon, how can *belief*, as a psychical phenomenen, enter into it? And if it is a compound of both, we may ask how such a compound is possible on the supposition that there is so sharp a distinction as Mr. Russell maintains between the "logical" and the "psychological," between the nature of a proposition and the belief in it. Again, if there is a truth which is independent of knowledge, is there also an error which is independent of knowledge? Such an error is surely unthinkable, and if so the word "truth" is ambiguous. In ordinary use it has error as its correlative; but as used in Mr. Russell's definition of knowledge, it has no such correlative. Accordingly, Mr. Russell's definition, when expressed unambiguously, seems to be that knowledge is unknown reality (relation-in-itself) plus belief. But it is necessary (unless we are to fall into pure scepticism) to explain how an unknown reality or a relation-in-itself comes to be believed. The only hint of such an explanation which I have found in Mr. Russell's book is that it is a matter of intuition. "The problems of philosophy," he says, "should be anterior to deduction. An idea which can be defined, or a proposition which can be proved, is of only subordinate philosophical interest. The emphasis should be laid on the indefinable and indemonstrable, and here no method is available save intuition" (p. 171). If this is Mr. Russell's solution of the difficulty, I can only regard it as an expression of the unreasoned faith, which is the constructive side of scepticism.

One might similarly point out the ambiguities in the term "knowledge" as it is used by Mr. Russell on the one hand, and by some of those whom he is criticising on the other. Knowledge, for instance, would seem, on Mr. Russell's definition of it, to have

no degrees distinct from degrees of belief. A true proposition must be either fully known (when it is accompanied by the psychical phenomenon of belief) or completely unknown (when it is not accompanied by belief). If this be so we are at the mercy of the old sophist dilemma which sought to prove that we can never begin to know. But, without developing this point, I would merely notice that Mr. Russell apparently regards knowledge as something entirely separate from its object, so that it is impossible for the two to be in any way identified. He thus seems to me to do away with self-consciousness. "If we were to say that truths actually constitute God's understanding, and if this is what makes them true, then, since we must always distinguish between a proposition and the knowledge of it, the impious consequence follows that God can have no knowledge. Truths *are* God's states of mind, and *we* know these truths; but God cannot know them, since knowledge is distinct from what is known. And generally if a truth be something existing in some mind, then that mind, and another which knows the truth, cannot be aware of the *same* truth. If we once admit that there is one and only one Law of Contradiction, which is the same whoever knows it, then the law itself is something distinct from all knowledge, and cannot logically depend upon God's mind. Unless truth be distinct from God's knowledge, there is nothing for God to know" (pp. 180, 181). But knowledge is always "some one knowing," and if what is known can never be the same as what knows, God (for instance) can never know Himself, for God knowing must always be different from God known. Is it not possible that knowledge may be distinguishable from what is known, without a complete separation between the two, such as Mr. Russell's argument seems to imply? Is not Mr. Russell using the law of contradiction as a law of pure identity to the exclusion of difference? The passage I have just quoted throws considerable light upon the presuppositions of Mr. Russell's main arguments. It manifestly implies that there is a multiplicity of quite independent minds, each mirroring or "believing" truth, and that there is no way of reconciling this variety of individual minds with the unity of a universal mind. Mr. Russell may possibly be right in this; but it is a position which requires to be proved. It is a direct denial of the fundamental principles of modern idealism, and therefore to assume it as the basis of a criticism of idealism is to beg the question.

From what has been said it is evident that Mr. Russell cannot admit that there are any analytic propositions. All judgments (I gather from what he says), are fundamentally both necessary and synthetic. For an analytic judgment is one in which the predicate is in some way contained in the subject, and no proposition is ultimately of the subject-predicate form. Accordingly he argues with much acuteness that "Leibniz's theory of definition, as consisting of analysis into independent simple ideas, is inconsistent

with the doctrine that the 'primary principles' are identical or analytic; and that the former is correct, while the latter is erroneous" (p. 19). Leibniz is clearly inconsistent; but it would have been interesting to know on what grounds Mr. Russell assumes that, if no judgments are purely analytic, all must be purely synthetic. May not all judgments have an analytic as well as a synthetic side? In order that there may be a system of knowledge, in which we can pass by an apparently analytic process from one element to another, is it necessary to assume a multitude of indefinables external to the system and on which the system depends? The difficulties of such an atomist epistemology seem to me much greater than those of a thoroughly idealist position; and I should be inclined to hold that a solution of the difficulties which, it must be admitted, modern idealism has not completely met, is to be found rather in carrying out idealist principles more thoroughly than in departing from them. In this connexion I would suggest that the controversy regarding analytic and synthetic propositions (as well as that regarding the import of the proposition, which is much the same question in another form) has been due in great part to the tendency to treat the proposition as the self-sufficient unit of thought. Mr. Russell's arguments seem all to tend in the direction of regarding the concept as the true unit, while I should prefer (in what seems to me the spirit of idealism) to insist that every proposition has a thought context, and is to be conceived as an element in one all-comprehensive rational system. Propositions would thus be conceived as abstract elements in a rational system and concepts as abstract elements in propositions, the part in each case presupposing the whole, rather than the whole the part. It is impossible satisfactorily to discuss the question whether the subject-predicate or the relational theory of the proposition is the true one, until we are clear as to what is meant by the (supposed) subject of a proposition. And it is too often assumed (as I think, erroneously) that the subject of a proposition can be known apart from the thought context. This is the case, for instance, when it is supposed that the subject is determined by the principal grammatical substantive in the sentence, and some such supposition seems to underlie Mr. Russell's argument on page 12 (quoted *supra*).

For the distinction between analytic and synthetic propositions Mr. Russell substitutes that between non-existential and existential propositions. "Eternal truths" are non-existential, while existential propositions are those which involve a reference to parts of time. "The law of contradiction or the proposition that two and two are four or the truths of Geometry . . . are wholly incapable of existence, and what exists is only the knowledge of them" (p. 180). "This principle" (the existential and non-existential principle of division) "leads to the same division of propositions as that to which Leibniz was led, and may, by examination of his words, be shown to be the true principle on

which his division proceeded" (p. 25). It is in connexion with this distinction that the chief confusions and inconsistencies of Leibniz's philosophy appear, and Mr. Russell develops this with very great skill, especially in his chapters on "The Law of Sufficient Reason" and "The Proofs of the Existence of God". According to Leibniz "existence is unique among predicates. All other predicates are contained in the notion of the subject, and may be asserted of it in a purely analytic judgment. The assertion of existence, alone among predicates, is synthetic, and therefore, in Leibniz's view, contingent" (p. 27). Yet, as Mr. Russell points out, the ontological proof of the existence of God, urged by Leibniz, depends on the view that existence *is* a predicate contained in the subject, a view inconsistently expressed in one passage by Leibniz himself. To discuss the validity of this distinction between existential and non-existential propositions is impossible within the limits of this notice, but the question is in another form the problem already touched upon, whether or not the distinction between "truth" and "knowledge," the "logical" and the "psychological" is so complete as Mr. Russell makes it.

Mr. Russell's book from beginning to end is full of points suggestive of discussion; but this review would be interminable were I to consider in detail the various matters I had noted for comment. It must be sufficient to notice that Mr. Russell's theory of knowledge inevitably colours the whole of his exposition and leads him to attribute very slight importance to certain elements of Leibniz's philosophy (*e.g.*, the law of continuity), which have been insisted upon by other expositors. And in the same way, although he does not minimise the function of Sufficient Reason in Leibniz, he seems to me hardly to do full justice to its meaning. In thinking thus, I may, of course, be reading more into Leibniz than is really to be found in him; but what one does find in him depends a good deal on the point of view from which one regards his philosophy. On the exceedingly difficult question regarding Leibniz's views of space and matter and on the relation of his dynamics to his metaphysics Mr. Russell's exposition throws more light than does any other commentary I know of, although there are many points in his criticism which seem open to discussion.

In this notice I have thought it best to confine discussion mainly to Mr. Russell's fundamental position, which may be put briefly in his own words: "Spinoza had shown that the actual world could not be explained by means of one substance; Leibniz showed that it could not be explained by means of many substances. It became necessary, therefore, to base metaphysics on some notion other than that of substance—a task not yet accomplished" (p. 126). Whatever may be one's opinion as to the truth of this contention, one cannot but be glad to have so able an argument for it as that which Mr. Russell has given us. He is to be congratulated on having written a remarkably clever book, which, owing to

its thoroughness of investigation and acuteness of argument, will be of the utmost value to the careful student of Leibniz.

R. LATTA.

The English Utilitarians. By LESLIE STEPHEN. In three volumes. London : Duckworth & Co., 1900.

IT would have been difficult to find any one better fitted than Mr. Stephen to write the history of "the compact and energetic school of English Utilitarians"; and it is superfluous to praise his achievement. He knows the school from within, and with their attitude to the controversies of their time he has the sympathy of a disciple. When the Utilitarians were still an intellectual and social force, he seems, like "the majority of the more thoughtful lads" of his generation, to have been attracted by their clear-cut theories, their vigorous polemic, and their philanthropic spirit. As he himself tells us in the preface to his *Science of Ethics*, "J. S. Mill was the Gamaliel at whose feet" he sat in youth. But Mr. Stephen had his "day of Damascus" when he felt the impulse which Darwin gave to philosophical thought. The new light has inspired most of his published work. It may be an imperfect guide in philosophical and ethical questions : that is matter of controversy. But it has at least enabled him to appreciate the limitations of Bentham and his school, without losing a certain fundamental sympathy with them at almost every point of their varied activity. The influence exerted by the Utilitarian school, and the high character of its leaders, justify the labour which Mr. Stephen has bestowed upon them ; and the characteristic features of their doctrine make them an interesting study. They proclaimed a universalistic doctrine of morality ; but they founded it on psychological egoism, and constantly confused it with ethical egoism. They were empiricists by profession, and held strongly to the view that all knowledge comes from sense-experience ; but they preferred the deductive method in politics and economics, and argued from first principles which they hardly gave themselves the trouble to verify. They were sensationalists, but they wrote and thought as if men were mere reasoning machines ; they made pleasure and pain the sole motives of human action, but they constantly overlooked the power of the emotions ; they were strict determinists, and held with Hume that reason is the slave of the passions, and yet they seemed to think that they had only to state an argument in order to reform the world.

The present work, as the author describes it, is a sequel to his *History of English Thought in the Eighteenth Century ;* but it deals with one school of writers only, and they receive more elaborate treatment than any of the eighteenth century thinkers. The omission from the earlier work—which Sidgwick drew attention to in a striking article in the *Fortnightly*—of any adequate

account of Bentham is now made good, and Bentham's activity is dealt with as a whole, and in connexion with that of his collaborators and successors.

Mr. Stephen assigns a volume each to Bentham, James Mill and J. S. Mill. Undoubtedly these are the greatest names of the Utilitarian propaganda. But it is not without some loss of historical accuracy that James Mill's work is thus separated from Bentham's and treated apart. Bentham was, of course, much the older man. If he had not reached the summit of his reputation by the time James Mill was introduced to him, in 1808, he had at least done almost all the more important and original work upon which his reputation rests. But he continued to the last to be the head of the Utilitarian school, and the assistance given by the more philosophical intellect of Mill never led to the latter superseding Bentham in the leadership of the school. And Bentham's long life did not admit of Mill becoming, in any effective sense, his successor. Mill died in 1836, only four years after Bentham; and during the last six years of his life (*i.e.*, after his *Fragment on Mackintosh*) he wrote but little. Up to the date of the first Reform Bill, Mill was associated with Bentham as a leader of the Utilitarians; after that date, the year of Bentham's death, Mill's work too—apart from his official duties—was almost done.

The work opens with an interesting discussion on the formation of philosophical opinion, followed by a series of chapters on the political, industrial and social conditions which determined the rise of the Utilitarians and gave them their problem. Of these chapters it is sufficient to say that they are worthy of the historian of English Thought in the Eighteenth Century. Mr. Stephen's knowledge of the literature of the period is probably unrivalled, and there must be few who can rival his knowledge of its social conditions. He has a true eye for the salient features of a social movement or of a literary work, and he has the art of making them live in the sight of his readers. Throughout the whole work, indeed, he shows this easy mastery of detail[1]—he selects what is interesting and sums it up in an epigram.

Two courses are open to the historian of the English Utilitarians. He may regard them from the point of view of their time and its

[1] One or two small mistakes may be corrected. The Political Economy Chair at Edinburgh was founded in 1871, not early in the century, as suggested in ii., 51. By a printer's or clerical error, J. S. Mill is represented as having "disbelieved in innate principles *and in* the boundless power of 'association'" (iii., 72). The Leslie controversy, which convulsed ecclesiastical Scotland in 1805, is said to have been made a party question between Whigs and Tories (ii., 270). This view is at least suggested by Cockburn in his *Memorials* and by Francis Horner in his article on the subject in the *Edinburgh Review*; and is, no doubt, in the main, correct. At the same time, my friend, Prof. D. G. Ritchie of St. Andrews, to whom the leading names on both sides are familiar, informs me that there was so much cross-voting that the division can hardly be said to have been on purely party lines.

needs, finding in its social and political conditions the clue to their intellectual activity; or he may trace the development of the conception by means of which they sought to explain human action and to reform the social order. A full explanation of the Utilitarian movement requires an adequate treatment from both points of view. And both points of view are represented in Mr. Stephen's volumes. At the same time, I think he is more successful in showing how the organisation—or disorganisation—of society opened the way for the Utilitarian ideas, than in tracing the logical—or illogical—formation of these ideas. It is true that he gives a careful account of the philosophical writings of Bentham, James Mill and J. S. Mill, and that his summaries and criticisms are of no mean value. In one place or another the reader of these volumes will find all the chief points of Utilitarian doctrine discussed with good judgment and a true apprehension of the issues involved. At the same time, there is no account of the philosophical antecedents of the doctrine which can compare, for fulness and for the light it sheds on the history, with the first three chapters of the first volume, in which the external conditions of the rise of the school are set forth. The fourth chapter of the Bentham volume is entitled "Philosophy"; but it does little to trace the sources of Bentham's doctrine or the mode of thought which tended to form it by opposition. It deals with two writers only—Horne Tooke and Dugald Stewart. These writers influenced James Mill, but the formation of Bentham's doctrine was independent of them. The first part of the *Diversions of Purley* was published in 1786, six years after the printing (though before the publication) of Bentham's *Principles of Morals and Legislation*; and Dugald Stewart's *Elements* did not appear until 1792. It is not enough to say that "English philosophy barely existed" (i., 137). What is lacking is an account of the growth and changes of the Hedonist idea, especially among the successors of Locke—Hutcheson, Hume, Helvetius and Priestley. Various passages throughout the work show that Mr. Stephen might have given us here, in its proper place, an account of the intellectual descent of Utilitarianism. Mr. Stephen thinks that Bentham "did very well without philosophy" (i., 271). No doubt he did a very important work with great thoroughness and subtlety. But although not a philosopher in the sense of a metaphysician, he was yet a prophet of ideas; and all that he did is represented by himself as resulting from the application to life and thought of one simple and irrefragable truth. It is for the historian to show how he came by that doctrine, and to explain the peculiarities of his tenure of it: how he set side by side two sentences, one of which was intended to state a fact, the other to formulate a law or rule, without ever reflecting that the fact and the rule might not harmonise so well as their verbal similarity suggested; and how it was that as well his latest as his earliest writings combine statements of the rule for the individual which are expressly "egoistic" with statements which give the rule a

"universalistic" interpretation: and this although Bentham recognised 'extent' as one of the circumstances which differentiate one lot of pleasures or pains from another. The chinks in the Utilitarian armour have been pierced so often by hostile critics, that it would be wasted labour to aim another lance at them. On this the author has probably said enough; but it would have been worth while to show how the armour came to be forged with faults so fatal, and how it came about that its wearers were (to all appearance) so unconscious of the weak places in their own defences.

Mr. Stephen does well to emphasise that "the characteristic of Bentham's teaching . . . was not the bare appeal to utility, but the attempt to follow the clue of utility systematically and unflinchingly into every part of the subject" (i., 268). It was this painstaking thoroughness that made his criticism of legal procedure and penal law so impressive. On these two matters the Utilitarian criticism was unceasingly directed, and there seems no doubt that their improvement is to be put down to the credit of the Utilitarians. It is difficult to apportion rightly their share in other movements. Constitutional reform became an object with Bentham when he found out that the statesmen of his day did not desire the greatest happiness of the greatest number (i., 213); but in the agitation for Reform the Utilitarians were lost in the crowd. "They left to popular orators the public advocacy of their favourite political measures; and the credit of finally passing such of those measures as were adopted fell chiefly to the hands of the great political leaders. The Utilitarians are ignored in the orthodox Whig legend" (ii., 41). In matters of social reform it is almost surprising to observe how little can be set down to the Utilitarians in connexion with the great reforms of the first half of the century. It was not to their efforts that the Abolition of the Slave Trade was due. The Cotton Mills Act of 1819, which defined the age and hours of work of children in factories, was due to the impetus received from Owen, a "natural antagonist of the Utilitarians" (*cf.* ii., 120, 121); and the great Factory Acts of 1834 and subsequent years, were passed by means of the courage and devotion of the seventh Earl of Shaftesbury, who had no sympathy with the Utilitarian dogmas. To the factory legislation the Utilitarians were opposed on principle (iii., 37), and Mr. Stephen notes that soon after the passing of the Reform Bill "Philosophical Radicalism died out. Its adherents became Whigs, or joined the Cobden form of Radicalism." The free-trade leaders, "Cobden and Bright, though they accepted the political economy of the Utilitarians, could not be counted as products or adherents of the Utilitarian philosophy. The agreement was superficial in other respects, though complete in regard to one important group of measures" (iii., 38, 39). On the other hand many of the pet schemes of the party came to nothing. Bentham's Panopticon was a costly plaything; and his Chrestomathic school "fell com-

pletely flat" (ii., 22). The Utilitarians did, however, play the leading part in the formation of the University of London in 1828, afterwards, as University College, affiliated to the new "examining body called the University of London" in 1836. "It has, I suppose," says Mr. Stephen, with perhaps unnecessary caution, "been of service to education, and may be regarded as the one practical achievement of the Utilitarians in that direction, so far as its foundation was due to them" (ii., 33). The intellectual activity of the Utilitarians is described with fulness and in a most attractive manner by Mr. Stephen. Of Prof. Bain's *James Mill*, he says apologetically, "if rather dry, it deals with a dry subject". This dry subject is full of interest in Mr. Stephen's own pages. The volume on James Mill deals, for the most part, with political and economic theory, and contains chapters on Malthus and Ricardo, as well as on the Psychology and Ethics of James Mill, and on the Utilitarian attitude to Religion. The volume on John Stuart Mill continues the method of treating its subject in connexion with the whole movements of contemporary thought. It forms probably the most complete and judicious discussion which exists of J. S. Mill's attractive personality and varied philosophical work. Successive chapters deal with his Logic, Political Economy, Politics and Ethics, and Philosophy. A chapter inserted before the last gives an interesting account of Austin, Grote and Buckle, though it is perhaps hardly adequate to its title 'Historical Method'. The general tendency of the criticism may perhaps be represented by one sentence: "It is truer to say that he could not accurately formulate his beliefs in the old dialect than that his beliefs were intrinsically erroneous" (iii., 293). The logical principles of Mill are, however, subjected to a criticism which goes much deeper than this, if, indeed, it does not point beyond any form of Empiricism. It is of interest to note that Mr. Stephen records his disagreement with the late Sir J. F. Stephen's criticism of Mill in the *Liberty, Equality and Fraternity* (iii., 244 n). One other point may be mentioned, though it is hardly likely that a protest in favour of consistency will receive attention. Mr. Stephen quotes with approbation (iii., 430) Mill's famous "to hell I will go" retort upon Mansel. Mill's fiery indignation has awakened sympathetic echoes in the breasts of generation after generation of readers. But it is surely time now to let this little bit of rhetoric pass into oblivion. It is only one case among many of Mill's use of moral notions in a way which is hopelessly inconsistent with his own theory of morality. Morality is, for Mill, a means of avoiding pain and getting pleasure; and "hell," as he uses the term, means a place of infinite pain, and not, as his young followers seem to think, a *salon* for the intellectual *élite* of the universe. If an omnipotent tyrant order Mill to call him good upon pain of being sent to hell, then it is plainly a part of Utilitarian duty to flatter the tyrant to the top of his bent, to crouch before him, to call him

'lord' and 'good,' to do anything he may order, rather than meet infinite pain oneself and encourage others to incur the same fate. Whatever fragment of nobility there may have been in Mill's rhetoric belongs to a moral doctrine in which he has himself no share. It has meaning only if hedonism has been first of all flung to the winds.

W. R. SORLEY.

Experimental Psychology: a Manual of Laboratory Practice. By EDWARD BRADFORD TITCHENER. Vol. i., "Qualitative Experiments": Part i., "Student's Manual"; Part ii., "Instructor's Manual".

THESE two volumes, part i., the "Student's Manual" of 214 pages, and part ii., the "Instructor's Manual" of 455 pages, constitute the first half of the whole work. The two parts run parallel with one another, and each is again divided into two parts, of which part i. deals with 'Sensation, Affection, Attention and Action,' part ii. with 'Perception, Idea and the Association of Ideas'. The work of the student is grouped under the headings of thirty-eight experiments. In the "Student's Manual" each of these sections consists of a short discussion of the object of the experiment, a short description of the apparatus to be used; very full directions to the pair of students for their conduct of and during the experiment or the group of related experiments; and finally a series of questions well designed to encourage the student to think out for himself the meaning of his results, and to stimulate his interest in the historical and systematic bearing of the experiments. In the "Instructor's Manual" the corresponding sections consist of fuller discussions of the bearing of the experiments; fuller descriptions of apparatus with numerous illustrations, especially of pieces which, though of historical or practical importance, are too complicated or expensive to be put into the hands of the students; more directions for the conduct of the student; answers to the questions put in the "Student's Manual" or references to the appropriate literature; copious and well-chosen literary references; tables of the results actually achieved by average students, reproduced here in order to set a standard of attainment that may be fairly expected of any student.

The novel division of the work into two parts dealing with qualitative experiments (the present double volume) and quantitative experiments (the volume yet to come) respectively is explained and justified by the author in his introduction. The two volumes are to treat of the same subject-matter from two different points of view. In working through this volume the attitude of the student is to be as introspective as possible, and the results sought are not numerical determinations but rather accurate introspective descriptions of the contents of consciousness during the experiments. The author follows and in the opening pages

justifies the sound principle that the study of psychology should begin with the study of the sensations under laboratory conditions. The ground he adduces is in substance that which follows naturally from the profound remarks with which Lotze prefaced the *Medizinische Psychologie.* Since this principle seems to be neither generally followed nor admitted in this country it may be worth while to attempt a translation of the passage: "For the education of the individual as well as for the development of a science it is always an unfavourable condition if we become acquainted with its subject-matter gradually and at a time when we still lack the capacity thoroughly to weigh it. Where a group of phenomena is suddenly presented to a developed and disciplined intelligence, there our understanding, well accustomed to the following up of definite problems, will probe to its depths quickly, and long before there is time for the fading away of the clearness with which the freshness of the impression endows its separate features. On the other hand a premature and only gradually widening acquaintance with the subject allows most of its peculiarities passively to escape us, all the more so the less our thought, not yet practised on other problems, is capable of being roused by the imperceptible increments of knowledge that a slowly progressing experience brings with it. The insufficient strength of these scattered perceptions fails to stimulate our understanding to any determined and thorough investigation, and we content ourselves with slight and incomplete hypotheses for each separate case; so this gradually acquired familiarity of the mind with its objects leads to the formation of disjointed groups of ideas, each of which conceals within itself a half-solved problem." The unavoidable handicap which is thus set upon every student of psychology at the outset of his labours by his previous familiarity with and by his slowly progressing knowledge of the facts of mental life can be reduced to its lowest degree, and to some extent obviated, by beginning with such a course of laboratory study as is laid down in this book, by beginning with the less known object, the comparatively isolated sensation, and working up to the better known, the 'real mind,' as Prof. Titchener says. For such a course of study this manual forms a most useful guide. The experiments are well chosen, the directions and explanations are for the most part lucidly written, emphasis is laid judiciously, and the book makes a pleasing impression as being a very genuine and probably successful effort to set students upon the right lines in beginning the study of psychology.

Since the author will, no doubt, be soon engaged in preparing a second edition, a few minor criticisms may be not out of place. There occur a few highly disputable statements which the author lays down as matters of fact, *e.g.*, the statements that objects seen in indirect vision under ordinary conditions are seen in their normal colours; that on going into a quite dark room from a bright one the room seems oppressively black and then brightens

in the first few minutes; that there can no more be a visual rhythm than there can be an auditory symmetry, and that only tactual and auditory sensations can form the basis of the perception of rhythm; that our localisation of the sources of sounds is mediate and not immediate. In this connexion one may note that in dealing with vision the author describes the facts in terms of Hering's theory. To this, of course, there can be no objection, since it is well-nigh impossible to deal with the subject save in terms of one theory or another, and Hering's is the one commonly accepted; but it should be made clear to the student that some of the statements are true only if that theory be the true one, and this has not been done. However, even errors have their uses in a laboratory manual, for there is nothing more stimulating to the student than to be able to convict his text-book of error through his own observations.

In the section on localisation of the sources of sounds there is no mention of Prof. Münsterberg's method. To some this omission will seem a serious defect. To English teachers the directions to the student will seem unnecessarily and even undesirably minute, for the following of directions so thorough and minute as those here given must tend to prevent the development of initiative and self-confidence in the students. However, in this respect the author does but follow what seems to be the accepted practice of American laboratories. The "Instructor's Manual" too seems to leave very little to the intelligence of the instructor.

It is impossible to feel sure that the plan of dividing the volume into instructor's and student's manuals is a sound one. More especially does this seem doubtful when a discussion or explanation is divided between the two parts, a little explanation for the student and a big one for the instructor. It seems to be an elaboration of the questionable principle of making a big hole in the door for the cat and a little one for the kitten.

About twenty pages of the "Instructor's Manual" are devoted to the mechanism of the eye. Were it not better to leave this to the text-books of physiology? Surely a sound knowledge of physiology may be demanded of the instructor as part of his general equipment if not of the student also.

The mechanical subdivision of both parts, both on the large and the small scale, is confusing and seems capable of improvement.

In one section at least (part ii., § 58) the author allows himself to present columns of words and figures in that exasperating manner (occasionally exemplified in the American journals of psychology) which causes a mere Englishman to turn the leaves to and fro in search of a clue, wondering disconsolately the while whether he too would have been able to understand these high matters had he enjoyed the good fortune of breathing the more stimulating air of the great country across the water. But these carpings aside, the present reviewer feels that Prof. Titchener is to be congratulated on having achieved success in a peculiarly

difficult undertaking, and on having produced a book that will be found extremely useful in every psychological laboratory.

W. McDOUGALL.

The Origins of Art: a Psychological and Sociological Inquiry. By YRJÖ HIRN. London: Macmillan & Co., 1900. 8vo. 10s. net.

FOR some time past it has been recognised that art has been a factor of no mean importance in the social evolution of man, and also there have not been wanting those who have recognised that the psychological aspect of art was worthy of careful study. A work which frankly attempts to trace the origins and some of the modifications of the artistic impulse from a psychological and sociological point of view is therefore to be welcomed, and it is not too much to say that the task which Dr. Hirn has set himself has been performed in a most efficient manner.

The present writer does not profess to be a psychologist, but having had several opportunities of studying primitive folk in their own countries he can testify that this work displays a sympathetic insight into the mental processes of backward peoples. This sympathy of the author's, combined with wide reading, sane thinking and a lucid and interesting manner of presenting his facts and arguments, have resulted in a most admirable contribution to science.

In the following sketch of the scheme of the book the author's own words have very largely been borrowed, and pains have been taken to give an accurate survey of the main arguments employed. It will probably be urged by some that Dr. Hirn has not covered the whole field of the inquiry, and many would have liked a more detailed study of some portions and a further extension of the argument in others; but an author has a right to set his own limits, and it is difficult to see how the subject could be better presented within so small a compass.

At the outset the author declares that historical and psychological investigation must replace the dialectic treatment. Art can no longer be deduced from general philosophical and metaphysical principles; it must be studied, by the methods of inductive psychology, as a human activity.

In spite of the universally accepted principle of "art for art's sake" it will often be found, especially among primitive folk, that some form of interest, personal, political, ethical or religious enters into the so-called disinterested æsthetic activity. But however useful, or even necessary, these dances, poems or formative arts may have been originally, they may have come by degrees to be enjoyed in the same way as we enjoy art.

Answers must be found to the questions, Why are works of art created? and, Why are they enjoyed? The play-theory formulated by Groos affords an explanation of the high artistic level

reached by primitive peoples, but we must look elsewhere for an explanation of the artistic impulse. The aim of play is attained when the surplus vigour is discharged, or the instinct has had its momentary exercise; but the function of art is not confined to the act of production, something is made and something survives.

The author admits in his discussion on the feeling-tone of sensation that every one knows that movement and unchecked increased activity generally create pleasure and, on the other hand, functional inhibition is closely connected with feelings of pain, but there is no unanimity with regard to the interpretation of these facts; for himself he adopts the explanation proposed by H. R. Marshall in his *Pain, Pleasure, and Æsthetics*. Exalted delight often manifests itself in ecstatic dances and songs which, properly speaking, rather relieve an incipient pain than express a pleasure. The motor impulses reflect themselves inwards and accumulate when their outlet is stopped, thus from bodily movements joy may be diverted to thought. "When a savage has attained so high a state of development as to be able to control the impulse to dance and yell for joy, the first dithyramb has been composed." While supplying man with a means of intensifying the feelings connected with all the varied activities of the soul, art at the same time bestows upon him that inward calm in which all strong emotions find their relief.

The instinctive tendency to express overmastering feeling so as to enhance pleasure and to seek relief from pain, forms the most deep-seated motive of all human activity. The fundamental hypothesis of this book is to derive the distinctive qualities of artistic production from this impulse and to prove that art is better able than any other kind of mental function to serve and satisfy the requirements which arise from this impulse. As art is in its innermost nature a social activity, the emotional activities have to be examined as they appear in the social relations of mankind in order to elucidate their connexion with art impulse. For example, it is very difficult for an individual to resist the contagion of collective feeling, and all strong feelings, whether pleasurable or painful, act as socialising factors; now, art is the most effective means by which the individual is enabled to convey to increasingly wider circles of sympathisers an emotional state similar to that by which he is himself dominated.

Rhythm must be considered as the simplest of all art forms. Wallaschek and Grosse have pointed out how important a part rhythm, by facilitating co-operation, has played in the struggle for existence, and Bücher further insists on the invaluable saving of effort which the individual obtains by regulating his movements in a fixed sequence of time. When an expression is fixed in rhythmical form its contagious power is incalculably increased, whether it be the gymnastic dance, unmelodic music, poetry or geometric ornament.

Whenever the feeling forms a part of a differentiated and fully formed emotion the impulse to social expression must avail itself of some more adequate means of transmission. Simple gymnastic dancing becomes pantomimic and dramatic representation is evolved. A histrionic element can also be noticed in all the various forms of artistic production, including, for example, literature and the formative and decorative arts of design.

By explaining the art-impulse as a form of social expression the author accounts for art-creation and art-enjoyment as activities which have their end in themselves. The emotionalistic interpretation supplies a principle which can be applied to all stages, the lower as well as the higher, of art development. A desire of "expression for its own sake," or rather for the sake of its immediately enhancing or relieving effects on feeling, may have operated as an art-factor in all stages of culture, and thus have given an autotelic value even to the lowest manifestations of art. The driving force in art-creation becomes comprehensible by this assumption, and the most distinctive features of the creation itself can be deduced from this psychological principle. In attempting to explain the refinement of artistic attention we can no longer restrict ourselves to the purely psychical factors, but are compelled to appeal to the influence exercised by the concrete work of art.

Just as moral feelings have been gradually developed under the influence of actions which may originally have been quite non-ethical, so the refinement of the æsthetic sense has been promoted by works of art which may themselves have served entirely non-æsthetic purposes. The play-impulse, the impulse to attract by pleasing, and the imitative impulse, for example, may have called into existence works and manifestations which fulfil the requirements of the several art forms. The play-impulse in particular must have been of incalculable importance in the history of art.

Dr. Hirn then proceeds to point out the importance which the lower art forms, such as the dance, pantomime and ornament have been as a means of interchanging thoughts, that is of conveying information. There is but one step between the impromptu dance or poem which tells of a recent occurrence, and a work of art which perpetuates the same occurrence to consecutive generations; but historical art is absent amongst the most primitive folk. Military peoples naturally derive great advantage from historical art.

The sexual element in art is carefully discussed; one chapter being devoted to the subject of 'Animal Display' as preparatory to a consideration of art and 'Sexual Selection,' the 'Origins of Self-decoration' and 'Erotic Art'. The conclusion is arrived at, that sexual selection never creates any quality of beauty. The decoration of the person, whether by ornament, dress, painting, tattooing and the like, serves primarily perhaps to distinguish the adult and marriageable individuals from other members of the tribe. Novelty has probably only been employed to facilitate at-

tention and not for its own sake, since there is a deep-seated and widely spread antipathy to every feature that diverges from the national ideal which may, however, be devoid of beauty. Ornaments which indicate valour or wealth are by no means worn solely for the sake of the women. Personal ornamentation, however, often has a magical significance. As a cause of artistic activity sexual selection does not operate everywhere; but even when there is no competition between rivals, sexual emotions may still find an artistic expression, and the strong emotional tension which accompanies pairing must of itself give rise to some mode of seeking relief by sound or movement. Finally, the author warns the student that apparently erotic representations have often a very different meaning, and what to an outsider may appear to be an immoral pantomime may be intended to serve in the interests of morality.

We have no space to follow our author into the relation of art and work which manifests itself chiefly in dances, pantomimic imitation of various activities and rhythmic music and song, these not only are useful in overcoming natural laziness, but they regulate work and make it more effective. The same applies to art and war, but the stimulation in this case requires to be greater, and amongst warlike peoples one finds highly developed choral dances which are capable of producing astonishing results, not only by infusing courage but by facilitating tribal unity of action and feeling. Military singers are able to bring themselves and their savage audience up to a pitch of frenzy which is almost equal to that produced by the dances. Contempt, which is hurled at the enemy, combined with threats and boasting, contribute to foster courage, and various decorative devices are employed to express these emotions. This "*Schreckschmuck*," as the Germans call it, is well exemplified in the fearsome military decoration of most fighting peoples and in the face shields of some districts of New Guinea and Borneo. The art production of military tribes has everywhere acquired some common qualities; their decorative arts as well as their poetry and dramatic dances are always characterised by an intense and forcible life, which is often combined by dignified power and graceful elegance.

The belief in a magical connexion between similar things is one of incalculable importance in the life of primitive man, and it has very widely exercised itself on the formative arts.

"To give information—that is, to widen our knowledge of nature and life; to propitiate—that is, to flatter our senses by the display of beauty; to stimulate—that is, to heighten our vital energy, and thus make life easier to live and life's work easier to perform; to work magic—that is, to produce an illusion of reality capable of leading to a confusion between the subjective and objective world; —these are all purposes which have been represented as essential to art. And it might be shown, if investigation were pursued into the later stages of development, that art on its highest plane still

bears the same relation to concrete utilities as it does on the lowest. Art never ceases to inform, never ceases to please, never ceases to stimulate, never loses something of a magical efficacy."

ALFRED C. HADDON.

A Manual of Psychology. By G. F. STOUT, M.A., LL.D. Second edition, revised and enlarged. London: W. B. Clive, University Tutorial Press, 1901. Pp. xvi., 661.

THE fact that a second edition of Prof. Stout's *Manual* has already been called for is another gratifying evidence of the advance of psychological study in this country. The book is avowedly an attempt to treat Psychology in a way which shall give the beginner "a real interest in the subject, and a real power of dealing with it even when familiar formulas fail him". The author has striven to avoid "the arid and dogmatic statements" which he has apparently found in most previous introductory manuals, and whether or not he actually succeeds in getting the average university student of the mental sciences to take an effective interest in psychology, he has certainly produced a hand-book which will be a stimulus and a help in that direction. The old abstract lines of treatment are ruthlessly disregarded and the actual character of psychical development, with its constant interconnexion of conation and cognition, is admirably put before us. Of course there are certain inevitable drawbacks. A want of crispness and definition will be felt by most beginners, and still more the partial ignoring of certain universally recognised types of conscious states. Thus the term *instinct* does not occur in the heading of any section, nor in the index. It has to be sought for under such heads as "Persistency with Varied Effort" in a chapter on "Characteristics of Perception". May I suggest that while it is of the highest importance to let the student realise that instinct is not an isolated and mysterious faculty, having a special field of activity, it is not necessary to taboo the time-honoured name? From the point of view of the teacher, it seems better to frankly recognise the old nomenclature and to exhibit its relation to the new.

For the most part the second edition is a reprint from the stereotype plates of the first; but there have been a good many important additions, omissions, and alterations, though none of any very great length. One of the most interesting changes is a fresh attempt to discriminate, from the psychological point of view between "object" and "presentation". Dr. Stout proposes to use the former term for "the whole which we are attending [? to] and endeavouring to bring before consciousness more fully and distinctly"; the latter is reserved for "the special characters or relations of the object as they appear successively in different phases of the cognitive process". This distinction between whole and part does not seem to be in the same plane as the more

ordinary distinction, also adopted, between the object as existing outside of my consciousness, and the presentation as a fact of my consciousness. The whole passage (and especially the note on p. 60) seems more difficult than the corresponding passage in the first edition. It is only fair to say that Prof. Stout, who is a teacher as well as a psychologist, sensibly tells the beginner that he "need not trouble himself if he does not understand this note". However the entire discussion, which is necessarily more metaphysical than psychological, would with advantage have been relegated to an appendix. From a purely psychological point of view the essential difference between "object" and "percept" seems to lie in the fact that the former is a mere concept, projected and detached from the individual consciousness, and referred to a system which is supposed to exist for all consciousnesses. It cannot be presented in sense-perception; it is essentially an abstraction employed to explain sense-perceptions.

The relation between pleasure-pain and conation is the subject of a rewritten section in book ii. chapter ii. Dr. Stout does not seem to have quite succeeded in demonstrating an essential difference between conation at its lower levels and mere feeling. Personally I am more and more convinced that the ultimate meaning of pleasure is appetition, and the ultimate meaning of pain is aversion. All these words in the final analysis mean the same thing, an attitude of the subject towards the presentation. A pleasant state is one which we want to retain or reinstate; an unpleasant state is one which we wish to terminate or avoid. Anything more than this is part of the content of the state not of the attitude of the subject. There is, then, no need to enumerate pure pleasure-pain and mere conation separately. They are one and the same thing; and so we fall back on the old twofold division of mental elements. No doubt at higher levels the distinction between feeling and conation is quite clearly marked, and emotion is a very different thing from voluntary decision. But the "hedonic aspect of consciousness" is at bottom the same as the conative.

In book iii. the chapter on the perception of external reality, which must have struck most teachers as wanting in detail, has been somewhat enlarged, and might with advantage have been enlarged still further. The importance of the process of self-projection which was insisted on half a century ago by Mansel in his *Encyclopædia Britannica* article, is now being properly appreciated by a few psychologists; and in the recent works of Dr. Stout and Dr. Ward this animistic factor receives its fullest recognition.

Book iv. has received little alteration. The new passage in chapter i. on the "fragmentariness" of images as opposed to percepts is interesting. By the "fragmentariness" of images is meant the want of continuity with the total "mass of sensational experience of which they would form part if they occurred as actual sensations" (p. 414). The term does not seem altogether

a happy one; but the characteristic discontinuity of images to which attention is called in the passage is certainly deserving of note.

One can understand that in his capacity of examiner, at any rate, Dr. Stout has got heartily sick of the term *apperception*, which played such an important *rôle* in his *Analytical Psychology*. To misapply the words of George Eliot, "there is hardly any mental misery worse than having our own serious phrases, our own rooted beliefs, caricatured by"—the blundering and the incompetent. Yet it is curious that he should have written another work on mental science a few years after the *Analytical Psychology*, and never have cause to mention the "blessed word" at all. For the sake of the bewildered student I had hoped to find in this second edition of the *Manual* some definite recognition of a term which has come to be regarded as *articulus stantis vel cadentis psychologiæ*. But the second edition is as silent on the point as the first; and there is a suspicion of levity in the way in which the author has silently discarded his old love.

It seems a pity too that in this new edition opportunity has not been taken to supply a fuller and more detailed account of the emotions. After all, the discrimination of certain types of emotional reaction has been forced on humanity by the needs of daily life. The same emotional categories have been recognised by the man in the street, the philosopher and the poet since the days when written literature began. The adequate classification of the emotions may be a hopeless task, but some sort of "natural history account" should surely have been included in such a book as this. It is true we have a valuable analysis of fear and of anger, but there is no sufficient treatment of what Dr. Bain calls "the tender emotion," or of the æsthetic feelings. When the inevitable third edition appears, it is to be hoped that this omission may be supplied.

There is no need to dwell on all the small changes that Dr. Stout has introduced. I note, however, that he comes nearer than before towards a repudiation of the "pure ego"; he no longer identifies subconsciousness with "sentience"; and a new section is added on "gradations of conative activity" which ought to make clearer the conception of "unity of consciousness as constituted by unity of interest".

That Dr. Stout's *Manual* is more difficult for the beginner to understand and to retain in memory than most of the crowd of Primers, Hand-books and Outlines, cannot, I think, be denied. But the student who takes the trouble to master it will have the advantage of a thoroughly fresh and first-hand introduction to the subject-matter of the science, unencumbered either by traditionalism or by devotion to relatively insignificant detail. And in spite of the modest preface, the book will more and more find its way into the hands of those who are much more than beginners, for I venture to assert that no psychologist, however accomplished, will read it without adding materially to his knowledge.

F. RYLAND.

VI.—NEW BOOKS.

Memory: An Inductive Study. By F. W. Colegrove, Ph.D., D.D. With an introduction by G. Stanley Hall, LL.D.

President G. Stanley Hall introduces the author and his work in complimentary terms. Of the latter he says it will be a serviceable *vade mecum* for practical teachers, that it is a plain, simple, scientific handbook, that it is very opportune, suggestive and stimulating.

The introduction necessitates a short criticism of the chapters that the book itself would hardly call for. The first chapter 'aims to orientate the reader' historically. The author attempts to summarise the views of a very large number of writers in forty small pages of large print, with the natural result that, if the reader is not already familiar with the views of any writer dealt with, he finds the summary unintelligible, while if he has any such familiarity he is not helped to a further comprehension. What can any one gain by reading of a certain author that he "attributes to the grey matter of the cortex the fixation of memory images, yet he ascribes the intelligent memory to the mind, while recognition is an ability of the soul"? The second chapter is a jumble of animal anecdotes. It may be conceded that these would suffice to prove that some animals have memory and instinct, but these facts have never been intelligently doubted. The author makes much of Hering's use of the term 'organic memory' to cover every kind of modification of organs and organism resulting from use. The essential and vastly important problem raised by this use of the word memory may be stated thus: Can we get from the study of the development of the nervous systems and the habits and instincts of animals evidence of the inheritance of the effects of use; and were all purely nervous activities originally acquired by the aid or with the accompaniment of consciousness? Prof. Colegrove seems to be dimly aware of the existence of this problem, and touches upon it in a confused manner, but fails to select and arrange his anecdotes to throw light upon it.

In the third chapter, on diseases of memory, the author contributes a few extremely ill-reported clinical cases, and hopelessly confuses false memories with accurate memories of illusions and hallucinations.

The chapter on 'Brain and Mind' consists of irrelevant pickings from text-books of physiology. As a sample of gross inaccuracy may be quoted the statement that if an animal "loses the 'arm centre' (of the cortex of the cerebrum), he cannot use the corresponding limb at all, or only in the most feeble manner, nor can he ever recover" (p. 141). As a sample of lucid and exhaustive exposition of a difficult subject the following passage may serve: "The chief theories of the physical basis of consciousness are: (1) that of Lewes, who holds that the nerve process is irritable, and is therefore conscious. He believes that each nerve centre has its own consciousness, and that the consciousness of the individual is only the outcome of many lower consciousnesses. The

other theory is that a given degree of development is necessary before consciousness appears." In chapter v. the author propounds what he calls the hypothesis of 'Genetic Parallelism'. Of this one can only say that it is silly. The rest of the chapter is feebly anecdotal. I transcribe one passage: "By exercise a muscle acquires new power, which is due in part to a change in the muscles themselves, but such memories are associated with the nervous system. This is possible because the motor nerve terminates in the centre of the muscles and throws off branches in all directions."

Chapter vi. deals with the answers received from 1658 persons to a series of questions. The results might have been interesting if they had been presented intelligibly, and if there were any evidence of intelligent handling of them. A fair example is the handling of the answers to one of the questions that "called for the book read before the age of nine which is best recalled". We are told that the books most frequently mentioned were light stories such as *Jack and the Beanstalk* and nursery rhymes. Next in frequency were novels, and we are told that of the novels *Robinson Crusoe* was mentioned almost as often as all others together. Fairy tales come next in frequency. "Of other books, Bible stories are designated by 43, didactic works by 11, biography by 14, history by 13, natural history by 16". We are then informed that the following precious pedagogical indications are unmistakable: "Historical and didactic novels are most potent of the permanent influences. Scott and Lord Lytton, not mentioned here, if read early will be remembered. The Bible stories are the portions of sacred Scripture best suited to the child. Biography is well remembered and most instructive. There could be no better reading to appeal to the permanent interest of the young than some of the best of Jowett's *Dialogues of Plato*." Could anything be more inane and worthless? Remembering that 1658 persons returned answers, these conclusions will remain sufficiently strange even if we classify *Robinson Crusoe* as a didactic and historical novel, or believe it to have been written by Scott or Lytton or both of them. The chapter is full of gems for quotation; we are told: "The following memories belong wholly or chiefly to the Indians: Lakes, rivers, wolves, coons, owls, fishing, skating and negroes". And again: "The racial experience also crops out. One could hardly find an Indian or white child afraid of a candy sheep's head because the teeth showed, but this was the earliest memory of a negress."

Chapter vii. opens with a passable popular account of apperception, and then displays several tables of figures of 'recognition-times' whose value is a minimal if not a minus quantity.

The value of the final chapter on pedagogical applications can best be illustrated by extracts—"Senses, such as we possess, when trained correctly multiply experiences and memories an hundredfold. Manual training educates the senses and thus gives rise to definite motor memories. The child must be placed where different stimuli will act upon his nerve-centres." "It may, however, be stated that a teacher is not efficient in proportion as the pupils know little of the subjects studied." And as a final conclusion, admirably in keeping with the rest of the book—"Perhaps the whole matter may be left to the common sense of teachers who are alive to many pedagogical maxims and who have a genuine interest in the pupils. We are obliged to leave the subject with them, for no definite boundary can be drawn between the task, on the one hand, of acquiring what is new and interesting and, on the other hand, of laying up permanent stores of information." But it would require pages of extracts to give an adequate idea of the futility

of the whole book. It has no merits, it is a confused mass of superficial, irrelevant and inaccurate verbiage. The book belongs to that class of printed matter which is becoming a serious nuisance to psychologists. President Hall's introduction seems to me as regrettable as it is unjustifiable, for not only must it tend to the detriment of psychology in general, but it may lead numerous persons to read this book, and every minute given to it will be a minute wasted.

W. McD.

The Mediterranean Race: a Study of the Origin of European Peoples (Contemporary Science Series). By G. Sergi, Professor of Anthropology in the University of Rome. With 93 illustrations. London: Walter Scott, 1901. Pp. xii., 320. Price 6s.

Prof. Sergi's main thesis is that a dolichocephalic race, having its origin in North Africa, and extending outwards from the Mediterranean basin as far as the Somalis and Masai in one direction and the Vikings of Scandinavia in the other, can be shown to have occupied this extensive region in neolithic times, and to constitute even to this day a well-marked and representative strain in its population. For the rest, the writer may almost be described as 'anti-Aryan'. Though forced to admit that the brachycephalic 'Eurasiatics' were in the main successful in imposing their linguistic forms on the peoples of the 'Eurafrican' stock, he labours to prove that Mediterranean civilisation is an indigenous product for which the latter are more or less exclusively to thank. It is not, however, on the archæological side of the argument that stress is laid; and, in this regard, whilst the handling is original, the matter is admittedly derived. For his chief clue the author relies on his own craniological researches. He has invented a method—one would have preferred a more technical description of it, even in a semi-popular work—whereby skulls are classified according to their cranio-facial skeletal characters; and this he claims to be scientific and 'natural,' as compared with the method of indices, which he pronounces so artificial as to afford no criterion of race whatever. Thus a specimen, which on the strength of its bare length and breadth measurements would have to be reckoned brachycephalic, may yet, he maintains, be clearly seen to be Eurafrican, if viewed from above and from in front in the manner he prescribes. On the other hand, the true brachycephalic type of Asia may similarly be perceived to belong to a distinct 'zoological species' (surely a rather strong expression!). It would have been interesting to hear whether the remaining human types can also thus be differentiated, so as to leave us none of those antipodean parallelisms which have hitherto interfered with all attempts at ethnological classification by areas. From a philosophic point of view, one would likewise have been glad to learn how the absolute persistence of cranial character which this method postulates is explicable on ordinary principles of Evolution. If the influence of the environmental factor is to be recognised at all, why allow it no effect whatever upon the form of the skull, whilst saddling it with so much responsibility as regards the production of size and colour variations? As an example of the way in which Prof. Sergi brushes aside awkward difficulties of this latter kind, more particularly in respect to pigmentation, it may be mentioned that the 'xanthic' features of the Kabyles are explained as simply due to their mountain *habitat*. Speaking personally as one who has had the privilege of assisting at a large clan-gathering of that interesting people, and has marked the extraordinary contrast between their blue eyes and light hair and the dark

eyes and locks of other Berber tribes at present living under almost precisely similar physical conditions, I cannot but regard this as a crucial instance of the way in which ethnologists seek to lighten the ship by cheerfully throwing each the other's luggage overboard.

R. R. Marett.

Cornell Studies in Philosophy. (1) *Some Problems in Lotze's Theory of Knowledge.* By E. P. Robins. Edited, with a biographical introduction, by J. E. Creighton. New York: The Macmillan Co., 1900. Pp. v., 108.

(2) *Brahman: A Study in the History of Indian Philosophy.* By H. de W. Griswold, 1900. Pp. viii., 89.

(3) *The Philosophy of Friedrich Nietzsche.* By G. N. Dolson, 1901. Pp. vii., 110.

All three of these Studies are distinctly above the general average of doctorate theses. The first, which is also perhaps the best, was left partly unfinished by the untimely death of its author, and has been prepared for the press by Prof. Creighton. Its aim is "sympathetically to interpret the spirit of Lotze's system as a whole, to do justice to the philosopher by taking him at his best rather than to exhibit the literal inconsistencies of his system". The three chapters deal with Lotze's problem and method; his mediation between Kant and Hegel with regard to knowledge; and his general view of the relation of knowledge and reality. The second monograph offers "a special study of the doctrine of Brahman, the central conception of Indian philosophy and religion, . . . a study both in the history of philosophy and in the history of religion". The method followed is both genetic and comparative, and the style clear and straightforward. Technical criticism must be left to others; but the Study is interesting even to the layman in things Oriental, and throws much light on the psychology of the Indian mind. The third thesis gives a critical and at the same time a reasonably sympathetic account of Nietzsche's philosophical writings. An introduction is followed by chapters on the æsthetic, intellectual and ethical periods of his activity; the final chapter discusses his relation to Schopenhauer, Hegel and the Hegelians, the Neo-Kantians, and the 'decadents' of literature. Apart from an occasional tendency towards oversubtlety (as, *e.g.*, in the discussion of the *Uebermensch*), Miss Dolson writes soundly, and her conclusions will probably find general acceptance. The Study ends with a seven-page bibliography.—But why, as these monographs are issued in book form, should they lack an index?

A Study of Social Morality. By W. A. Watt, M.A., LL.B., D.Phil. Glasgow. Edinburgh: T. & T. Clark. Pp. i., 287.

The object of this study of the 'main principles of the social virtues' is to "help the reader to classify his conceptions of the whole, but without the emphasis being laid on the more speculative portions of the subject". Throughout, the author attempts to "keep in touch with the doctrine of common sense".

In other words, the reader is to be helped to obtain a system of Ethics (for an "Ethical System of some sort is necessary") which shall have no metaphysical or scientific basis, and at the same time shall not give him any concrete code in detail. The latter he is to get by "adapting the outline to his own views and purposes". Such an attempt would not

seem to hold out much hope of success, and, as a fact, what little hope is, or might be, present to begin with, is destroyed by the superficial and disconnected style of treatment adopted by the author. The whole book is composed of little more than disconnected jottings—largely quotations from other authors—aggregated together without any logical coherence, and coming to no definite conclusion. Any one quotation taken separately, and many also of the author's own remarks, might indirectly help the student by giving him something to think about, but further help than this he will not find.

Medicine and the Mind. By M. DE FLEURY. Translated by S. B. COLLINS. London: Downey & Co.; New York: Chas. Scribner's Sons, 1900. Pp. xi., 373. Price, $4.50.

This is a readable translation (not indexed) of Dr. de Fleury's *La médecine de l'esprit*, a work to which the French Academy awarded the *Prix Bordin*. Part i., "Of Certain Ideas Entertained by Physicians," starts out from the work of Charcot and his pupils upon hysteria and hypnotism, and proceeds to study the relations of medical science to law, literature and art. A brief sketch of the functions of the brain leads up to a discussion of strength and fatigue, nervous exhaustion and tone, in which the attempt is made "to account for the spontaneous oscillations of vitality among neurasthenic sufferers in particular, to detect their mechanism and to reproduce them experimentally". Part ii., "A Medical System of Morals," details the hygienic treatment of indolence, melancholy, sexual passion and anger. "The new morality is hygienic, science raising itself to the dignity of a practical philosophy; it is therapeutics dealing with the temporary weakness or more serious paralysis of our will, the great regulator of the human machine. . . . If the hygiene which we desire succeeds in teaching men to live worthily and to work well, then it is in truth a sound morality."

Clinical Studies in Vice and Insanity. By G. R. WILSON. Edinburgh: W. F. Clay; New York: The Macmillan Company, 1899. Pp. xi., 234.

These Studies are three in number. The first deals with drunkenness and alcoholism, considered as always a morbid affection of the purposive or self-directive functions of the mind, with special reference to the dynamics of cerebral processes. The second treats (with cases) of the alcoholic predisposition and diathesis. The third is a clinical study of fifteen cases of insanity, with digressions on etiology, pathology and treatment, and with special reference to the spiritual factor in mental disease. The author writes lucidly and with good critical balance. Both the theoretical discussions and the clinical pictures are of high importance to the student of psychology.

The Principles of Biology. By HERBERT SPENCER. Vol. ii. New York: D. Appleton & Co., 1900. Pp. xii., 663.

The additions made to this volume are less numerous and important than those made to volume i. A chapter on the "Integration of the Organic World" "serves to round off the general theory of evolution in its application to living things". There are three new appendices, on the "Annulose Type," on "Physiological or Constitutional Units" and on the "Inheritance of Functionally Caused Modifications". The chapter

on differentiation of animal tissues into inner and outer contains a new section on the establishment of the nervous system, and footnotes and notes appended to chapters occur here and there throughout the volume.

A System of Ethics. By F. Paulsen. Translated and edited by F. Thilly. New York: Chas. Scribner's Sons, 1899. Pp. xviii., 723. Price $3.00.

This is an accurate and sympathetic translation of a good book. Prof. Thilly has omitted book iv. of the original (*Umriss einer Staats- und Gesellschaftslehre*), and also the sections of book iii. that relate to the duel. The translation is made from the fourth German edition, and is enriched by notes and bibliographical references.

Essai sur l'imagination créatrice. Par Th. Ribot, Membre de l'Institut, Professeur au Collège de France. Paris: F. Alcan, 1900. Pp. vii., 304. Price 5 fr.

Like all that comes from M. Ribot's pen, this work is at once entertaining and valuable, although it claims to be only an essay, and not a complete treatment of one of the most difficult and most neglected portions of psychology. It is divided into three parts, of which the first is analytic, and the second genetic, whilst the last is termed 'concrete,' and reviews the principal imaginative types. Scientific interest centres chiefly in the first part, which, unfortunately, is in some respects the least satisfactory of the three. Much of the analysis is indeed excellent; but whether because of a want of connecting links between the different chapters or whatever the reason may be, it is not always easy to catch the general drift of the book. The details are usually precise; but there is a certain vagueness about the main outlines. According to the author's own statement, his chief thesis is that the creative imagination "has its principal source in the natural tendency of images to objectify themselves, or, more simply, in the motor-elements inherent in the image". In support of this view he contends (1) that motor-elements are essential to every representation, and that they tend to overcome its purely subjective nature and to externalise it; and (2) that every invention is due to some special need (there being no instinct of creation or invention in general), and that the emotion accompanying or causing this need includes a motor-element. But surely this is rather ambiguous. Are the motor-elements of the image identical with those of the emotion? An architect may have to design a new building, and may consequently imagine such a building; but the motor-elements in the emotion that provokes imagination are not those of the image. Or again, he may have imagined the building and therefore desire to have it constructed; but here again the motor-elements are distinct. Thus while both M. Ribot's contentions are true, there is no very close connexion between them. The only possible exceptions would be those cases in which the object represented is a movement or complex of movements; and it may be doubted whether even they are really exceptions. But M. Ribot seems throughout to attach too great importance to images of movements, and to argue from them to all classes of images, the reason being that he treats the actualisation of what is imagined as part of the process of imagination. It is probable that the more predominant the motor-elements in a representation are, the greater command we have over the image, and the better we can treat it as an object to be examined; and in this sense we may say that the motor-elements tend

to externalise the image. But M. Ribot seems to mean more than this, and to hold that our tendency to actualise our imaginations arises from the motor-processes they contain. That, however, holds only of imagined movements; surely it is plain that the motor elements in a visual image—*e.g.*, of a geometrical figure—do not tend to make us draw the figure.

So far no distinction has been made between the reproductive and the creative imaginations. As a matter of fact, however, M. Ribot's analytical work is not so much concerned with what he states to be his main thesis as with the question: What forms of association produce new combinations, and under what conditions are such combinations formed? Insisting justly on the importance of dissociation, M. Ribot finds "the principal source of the materials of creative imagination" in what is commonly called association by similarity, which is the combined work of association and dissociation. He then considers the intellectual, the emotional and the unconscious factors separately. The intellectual factor consists in thinking by analogy, of which the principal types are 'personification,' as exemplified in the myths of children and rude peoples, and 'metamorphosis' or 'transformation,' as when the noise of the wind is termed a sobbing, or again when the lion is taken to represent courage, etc. The emotional factor influences association in general according to the 'law of interest,' and it tends to produce new combinations partly through contrast, and partly owing to the fact that representations which have been accompanied by the same affective state incline to be associated together. Thirdly, there is the unconscious factor, at work in what Zichen has termed constellations and in mediate associations. With this influence is connected what is popularly called the state of inspiration, which should be regarded, the author points out, not as a cause, but as a sign, marking the end of unconscious and the beginning of conscious elaboration. But the three factors mentioned do not work in isolation. The unifying principle (chapter v.) is found in the ideal, the 'master-idea,' a mere rough outline at first, around which images, associations, voluntary efforts and the rest gradually group themselves. In his interesting treatment of this subject, M. Ribot points out that it is sometimes best to regard the unifying principle as a fixed idea, sometimes as a fixed emotion, but that there is no absolute distinction. On the relation of the ideal to attention, however, he is neither very precise nor very convincing.

We come now to the genetic part. In the first chapter M. Ribot deals with animal life, and finds the earliest traces of creative imagination in the play of young animals. In the case of children (chapter ii.), there are traces of it in illusions, but it is more fully displayed in the child's animism or personification of all things. The golden age of imagination (chapter iii.) is that stage of human development which is marked by the creation of myths, on which subject M. Ribot has a long and interesting chapter. In the account of the superior forms of invention (chapter iv.) two main types of imaginative procedure are mentioned, each dividing into three phases. In one the general idea appears at the very commencement, and is followed by a period of special 'incubation'; the second phase is that of invention or discovery; the third that of verification or application. In the other, the first phase is occupied with an unconscious general preparation; in the second phase the idea "appears" suddenly ('inspiration'); whilst the third is a period of construction and development. Newton is an example of the first type; Mozart of the second. Finally, M. Ribot gives a general law of the development of imagination both in the individual and in the race (chapter v.): It passes through

two periods, separated by a 'critical phase'. The first period is that of autonomy or efflorescence, as exemplified in the child; the critical phase is occupied with a struggle "between the pure subjectivity of the imagination and the objectivity of rational processes"; and, finally, the imagination in some manner and to some extent is itself rationalised.

Of the third part of this valuable work it must suffice to say that it provides excellent reading and is extremely suggestive. It consists of seven chapters, on various types of imagination: the plastic, the 'diffluent,' the mystical, the scientific, the practical and mechanical, the commercial, and, finally, the Utopian.

T. Loveday.

La Doctrine de Spinoza exposée et commentée a la lumière de faits scientifiques. By Émile Ferrière. Paris: Félix Alcan. Pp. ix., 340. Price 3 fr. 50.

The first edition of this book (pp. 1-260) would be useful to a beginner, especially if he were ignorant of Latin. It is a clear popular exposition of Spinoza's philosophy, which is fairly accurate on the whole. It would, however, certainly gain by vigorous compression and by the exclusion of those "theories of modern Scientific Metaphysics" which the author seems to accept as ultimate truths.

In the middle portion (pp. 261-302) the author contends (1) that Spinoza is consistent throughout his philosophy in the sense that he treats every department of experience alike—*viz.*, from the "Abstract" "Absolute" or "Theoretical" *and also* from the "Concrete" "Relative" or "Practical" point of view: (2) that Spinoza's results (though he professes to neglect Induction and to deduce everything *a priori*) agree in the main with "the conclusions established *a posteriori* by the inductive method. The author gives us a summary of these conclusions, which he has published at length elsewhere. They are, he tells us (p. 285, footnote), the fruit of "more than forty years' study devoted to solving the problems of Metaphysics by the aid of positive facts".

Under the circumstances it is perhaps natural that the author should be confident of the ultimate truth of these Results of "Scientific Metaphysics"; but it is only by misinterpretation and misunderstanding that he finds himself so nearly in complete agreement with Spinoza.

The rest of the book (pp. 303-340) consists of two Appendices: (1) a brief summary of Stoicism, and (2) on the origin and elementary constitution of ideas. Neither Appendix seems to be of any value.

H. H. J.

Ueber die materiellen Grundlagen der Bewusstseins Erscheinungen. Von J. v. Kries. Leipzig: Mohr. Pp. 54.

The purpose of this short essay, privately printed some three years ago, but not published until this year, is to protest against the overestimation of what the author calls the 'Leitungs-prinzip' by those who concern themselves with the elucidation of the workings of the central nervous system, and to point out its inadequacy as a principle of explanation. 'Leitungs-prinzip' is the author's designation of the doctrine that all nervous activity is of the type of that which alone has been studied in the peripheral nerves, namely, the simple propagation from part to part of each fibre of an excitation specific in character for each kind of nerve fibre and varying in each fibre only in degrees of

intensity, and the transmission of this state of excitation to other fibres or fibrils in a manner determined by the relative degrees of resistance offered to its passage. Prof. von Kries thinks that physiologists are too prone to be content with this relatively simple conception, and to assume that the only great problem is the anatomical one, that of the working out of the paths of the nervous impulses and their interconnexions. While admitting in a very limited degree the value of the 'Leitungs-prinzip,' he does not think it applicable to the higher mental activities, and he dwells upon various mental functions, the setting up of associations (as distinct from their strengthening after being once formed), the associative working of complexes, reproduction of temporal series, generalisation, etc., pointing out in each case in turn what seem to him insuperable objections to the attempt to account for them in terms of this principle.

In the course of the discussion v. Kries enters a timely protest against the tendency, so strong with several distinguished authors, to explain away all difficulties by the invocation of 'Begleit-erscheinungen,' especially those due to afferent impulses from the motor organs. As an alternative to the 'Leitungs-prinzip' he suggests what he calls the new fundamental idea of the plasticity of the neurons. This really seems to mean a return to the older or primitive view of the individual functioning of the nerve cells; that is, instead of seeking explanations in the modes of interconnexion of cells v. Kries would assign a primary importance to differentiation of processes within the cells, to 'intracelluläre Leistungen'. He reminds those who may be inclined to think that he is asking too much of the cells, of the marvellous properties of the egg-cell that seems to contain in some sense not only the specific but also many individual peculiarities of the person that is to grow up from it. It is interesting to find that a distinguished physiologist is thus led to a view similar to that adopted by E. v. Hartmann, who sets out from metaphysical and psychological grounds.

But v. Kries does not succeed in making clear this conception, and in fact hardly attempts to do more than urge the desirability of its further consideration. Nor does he, I think, succeed in establishing the case against the 'Leitungs-prinzip'; thus, to take two only of the various functions dealt with by him, we may admit with him that the 'Leitungs-prinzip,' pure and simple, cannot explain the setting up of associations, yet when supplemented by the principles of the radiation of impulses and of the residual excitement or state of raised excitability following the state of activity (new evidence for which appears in the recent work of Müller and Pilzecker) it would seem to suffice. The difficulties that v. Kries finds in the application of the 'Leitungs-prinzip' to the explanation of the activities which he groups under the name 'generalisation' arise from his overlooking the fact that what we have to deal with in the cases he brings forward, is not a generalising activity but rather a lack of discrimination of differences owing to lack of appropriate mental (or neural) systems. When a child calls every seen object 'mum-mum,' or at a still earlier stage of development reacts to all sensory stimuli by a wild waving of its arms, that is generalisation of the most extreme type in the sense of the word used by v. Kries; yet these cases, I think, present no difficulty for the 'Leitungs-prinzip'. There can be no doubt that v. Kries has put his finger on a weak spot, that there is in fact a tendency very general among physiologists to shrink back from any contact with consciousness, or to tacitly give up the central problem of mental physiology; of which tendencies the wide acceptance of the hypothesis of psycho-physical parallelism is the result. While realising

the value of v. Kries' work in insisting on the need of new fundamental conceptions distinctly physiological, not merely anatomical, in character, we may still hold that these should be designed to supplement and extend the application of the 'Leitungs-prinzip' rather than to supplant it. Of such supplementary principles two, enunciated by Exner, 'Hemmung' and 'Bahnung,' are admitted by v. Kries to have a high value; and though we may agree with him in thinking that not all Exner's explanations are valid, and may hold that in many cases Exner assumes as given by the higher levels of the brain the main part of that which he endeavours to explain, we must not forget that his is the work of a pioneer in this the most difficult, the most obscure, and perhaps the most important field open to scientific inquiry.

W. McD.

Der Aufbau der menschlichen Seele: eine psychologische Skizze. Von Dr. med. H. Kroell, Sanitätsrat in Strassburg i. E. Leipzig: Engelmann, 1900. Pp. v., 392. Price 5 m.

It would not be very easy to understand what purpose this book is intended to fulfil, had not the author himself offered an explanation. He was inspired to write it by the discussions of the Psychological Congress of 1896. From those discussions he seems to have gathered that many psychologists are still the slaves of "transcendentalism," and regard the soul as a ready-made article implanted in an alien world at the birth of the human body. In reply to such a doctrine Dr. Kroell has given us the view which his "unprejudiced observations as a medical man" have forced upon him. Unfortunately, the theory that he expounds, so far from being novel, is but a late-born specimen of an obsolete form of materialism. Beginning with a complaint, which in a certain sense may be justifiable, that matter and energy are too often regarded as really separate, whereas they ought to be regarded only as distinguishable, he then proceeds to assert (without a notion how fundamental an assumption he is making) that the sole content of the universe is the union of matter and energy which he terms 'Kraftstoff'. The rest of his theory follows naturally enough from this assumption. "We are ourselves a part of this 'Kraftstoff,' which has in our brain reached a form of development in which it becomes self-conscious and is thus able to investigate the modes of its own appearance." Accordingly, Dr. Kroell is not content to regard mental processes as dependent on physiological processes: he calls mental processes themselves 'modes of motion,' or he confuses psychological and physiological terminology, and talks of 'images rising in the brain' and of 'ideas sinking to the layer of neurons of memory,' or of 'movements passing through consciousness' on their way to 'another set of neurons'. The opening chapters of the book give in outline a commendably clear account of the structure of the nervous system. They are followed by a treatment of physiological questions which is of doubtful value in parts and throughout unduly dogmatic, the influence of a somewhat strange psychology being very noticeable. Farther on, the author deals at some length with the development of ethical principles and of society, occupying himself largely with a rather superficial discussion of the relative importance of individual organisation and of the environment as factors in the growth of moral consciousness. The chief attraction of the book is a simple honesty of intention; in style it makes a fine show of rather sentimental rhetoric.

T. Loveday.

Saggio sulle Idee Morali e Politiche di Tommaso Hobbes. Per GIUSEPPE TARANTINO. Napoli: R. Tipographia Francesco Giannini & Figli, 1900. Pp.

This essay deserves recognition as a serious and independent study of Hobbes's moral and physical philosophy. Signor Tarantino's estimate of the relation of Hobbes to contemporary speculation is in the main just and discriminating. He rightly rejects any sort of affiliation to Bacon, an error which still maintains a tenacious footing in most histories of philosophy; but he does not allow enough weight to the strong probability of a direct influence exerted on Hobbes by Galilei. A close study of Hobbes's works inclines us to assign the decisive stimulus to a scientific philosophy to the period of his third continental tour, 1634-37, and in this stimulus there is good reason to believe no one had so large a share as Galilei. Already in January, 1633, as we know from a letter in the Portland MSS., which Signor Tarantino does not appear to have consulted, he is hunting for a copy of Galilei's *Dialogues* among the London booksellers; Father Marin Mersenne, whom he came to know intimately in Paris, was busied with a translation of these same *Dialogues;* nor must the story, depending though it does on a single strand of evidence, be lightly dismissed, that it was Galilei who, when the Englishman sought him out in his Florentine villa, inspired him with the bold idea of treating moral and civil philosophy by the geometrical method, and thereby transforming a chaos of fluctuating opinion into a rigorously exact science. On page 43 the writer fairly censures Hobbes for roundly asserting that sense is nothing but motion, and points out that he has therein substituted the physical correlate for the sensation itself. In justice to Hobbes he should however have cited a passage in the *De Corpore* (iv., c. 25) which shows that Hobbes was quite conscious of the leap he had taken, and of the inadequacy of his solution. But the central paradox of the essay is to be found in chapters vi. and vii. The thesis that the writer supports may be most fairly stated in his own words. In the philosophy of Hobbes "il bene e il male hanno un valore in sè e per sè, indipendentemente dall'autorità dello stato" (p. 115); consequently that Hobbes recognises that the essential element in morality consists not in *doing* but in *willing*, not in the *content* but in the *motive* of the action (p. 91). In the first place we submit that the passages which Signor Tarantino adduces in support of his view do not, taken with their contexts, support it at all. We aver without hesitation that "moral" motives find no place in Hobbes's philosophy. His exposition of the laws of nature is a hardly veiled attack on the fundamental fact of morality. These laws are by him shown to be deductions of reason from the principle of self-preservation. Now if the principle of self-preservation, logically and calmly treated, can be shown to involve the erection of a sovereign power with an irresistible claim to obedience, the task which Hobbes proposes to himself is done. Morality is demonstrated by one and the same argument, the dictate of the reason of the individual, and the arbitrary creation of the sovereign will. Hobbes's critics then are right when they attribute to him *un etica unicamente instituzionale;* but Signor Tarantino is right, too, in insisting that they have not in so saying spoken the final word. Hobbes's dialectic is neither simple nor superficial, but to our thinking Signor Tarantino has not found the true clue to its unravelling. And the clue which he has employed has sometimes led him to a misunderstanding of his author, *e.g.*, he has quite failed to grasp Hobbes's re-interpretation of the distinction between the conceptions of "sin" and "crime" (p. 115). In conclusion we may note that the writer seems in no wise to have grasped

the real indebtedness of Hobbes to the lawyers. Endowed with a legal mind of a deductive cast, he was perpetually "operating" in moral and political philosophy with legal categories.

W. G. Pogson Smith.

Philosophia Militans. By Friedrich Paulsen. Pp. viii., 192.

The warfare of which Prof. Paulsen writes is that waged by philosophy against clericalism on the one hand and naturalism on the other. Dogmatic theology and natural science claim, each of them, complete mastery over human thought, and, agreeing in nothing else, agree in asserting the uselessness of metaphysics. Prof. Paulsen's object is to show that neither the one nor the other is entitled to this autocratic position, and that the peace can be kept between them only by a philosophy which in Kantian fashion marks off the boundary between faith and knowledge.

The five essays contained in the book have already appeared separately and are united only by the general purpose indicated above. Two of them are answers to recent Catholic pronouncements on philosophy and science. Another is an interesting sketch of Fichte as a champion of philosophical free-thought. Another, which appeared first in Vaihinger's *Kantstudien*, deals with Kant as the philosopher of Protestantism. All these essays are, if somewhat diffuse, extremely pleasant and interesting. The author's great knowledge of the history of European thought enables him to reply very effectively to his clerical opponents, and to exhibit vividly the relation of Kant and Fichte to the intellectual tendencies of their time. But it may be doubted, (1) whether the antithesis between faith and knowledge holds good, in the form in which Prof. Paulsen inherits it from Kant, and (2) whether, in any form, it ends the old quarrel between religion and science as completely as he seems to suppose. Surely he works with too simple a formula.

The fifth essay is different in character, and more important. It is a thoroughly fair and conclusive critique of Haeckel's pretentious monism. He makes great sport of a system which offers us long words in place of clear thinking, and which, riddled through and through as it is with inconsistencies, must either fall back into materialism or press on to a monism whose One is spirit.

W. D. Ross.

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VII.—PHILOSOPHICAL PERIODICALS.

Philosophical Review. Vol. x., No. 1. **E. Ritchie.** 'The Essential in Religion.' ["Religion is the intimate and vital apprehension, by the individual, of what is conceived to be reality, . . . whether such reality be regarded as co-extensive with, as included in, as inclusive of, or as distinct from the world of natural phenomena,—it always, however, being regarded as in some way related to the individual himself. Any such apprehension must embrace belief, emotional response, and the determination of conduct, in so far as conduct is supposed to have a bearing on the connexion of the individual with such reality."] **A. Fairbanks.** 'The Stoical Vein in Plato's *Republic*.' [Plato borrows a few conceptions directly from the Cynic mode of thought; he never frees himself entirely from the charm of that simplicity which characterises the Cynic 'state of nature'; and he accepts the phraseology of the Cynic principle and constantly uses it, though in a much broader and truer (more nearly Stoical) meaning than that with which it was originally propounded.] **H. Davies.** 'Method of Æsthetics: a Note.' [Scientific method has claims on the subject-matter of æsthetics, if this is to be made a science of beauty. The method also affects the problems of æsthetics, under the three heads of classification, explanation and criticism.] **J. D. Logan.** 'The Source and Æsthetic Value of Permanency in Art and Literature.' ["Art and Literature possess perennial charm only when their strictly æsthetic qualities (formal, technical, sensuous and moral) sustain a peculiar relation to the vital functions of our being. "Comparison of the artistic, the moral and the 'vitalistic' modes of æsthetic appreciation. Illustrations from sculpture, painting, music and literature.] **J. E. Creighton.** 'Methodology and Truth.' [Philosophy may accept the dictum of science as the last word on nature and man. Or she may point to the methodological character of scientific knowledge, and on this ground refuse to admit the value of science for the study of reality. Or she may take middle ground, admitting the significance of scientific results, but transforming these results for her own ultimate purposes. The first attitude leads to an untenable psychologism or naturalism; the second sets up the logically impossible ideal of a *reine Erfahrung*. Moreover, not even mathematics is purely methodological. Scientific results "are methodological, and false, and hypothetical, . . . but they possess an objective value which must be reckoned with in our philosophy".] Reviews of Books. Notices of New Books. Notes.

Psychological Review. Vol. viii. No. 1. **J. Jastrow.** 'Some Currents and Undercurrents in Psychology: President's Address.' [General review of the status and tendencies of American psychology. Emphasises the value for instruction of a functional psychology, and of a triple method (genetic, normal, abnormal). Defence of the method of 'mental tests'. Critique of psychical research. The relation of psychology to education.] **A. T. Ormond.** 'The Social Individual.' [The meaning of self as *socius* is worked out (1) analytically and (2) genet-

ically, under the three headings of social environment and heredity, the characteristic form of reaction (imitation), and the kind of definition or specification that the self obtains as a result. Conclusion: "We are able to enter into intelligible social relations without other only because our nature is such that we are able to draw from the inner definitions of our own consciousness, brought about by certain objective agencies, a concept or construct of the consciousness of the other, which we conceive to be a true representation of his inner experience".] **J. E. Downey.** 'An Experiment on Getting an After-image from a Mental Image.' [Positive experiments upon a girl, in her twenty-first year, well-educated, and absolutely naïve as regards after-images. A good paper, which should stimulate to repetition of the experiments upon other subjects.] **R. Dodge.** 'The Psychology of Reading.' [Critique of the recent article by J. Zeitler, *Philos. Studien*, xvi., 380.] **J. M. Baldwin.** 'A Scheme of Classification for Psychology.' [The scheme as agreed upon by the international committee sitting at Paris.] **J. M. Baldwin** and twelve others. 'A Disclaimer. [Relates to the use made by the publishers of certain articles on hypnotism.] Psychological Literature. New Books. Notes.

American Journal of Psychology. Vol. xii. No. 1. **A. W. Trettien.** 'Creeping and Walking.' [Attempts, on the basis of questionary returns, to "trace the various stages and attitudes assumed by the infant, and the movements which it employs in passing from the helpless stage of infancy to the time when the straightness and uprightness of body is taken" (*sic*). The embryo: position in utero; prenatal movements. The infant at birth: relative proportions of parts of the body; composition and structure of body. Treatment of infants among primitive peoples. Psychological aspect of voluntary and spontaneous movements of infants. Rising up: rolling over and creeping; standing: movements anticipatory of walking: rhythmical arm movements. Reversion; fright, hurry, falling; disease; imbecility and idiocy. The questionary is dated 26th January, 1900; the paper published October, 1900. This brief space for preparation may account for the psychological jejuneness of the inquiry, and for the bad spelling, bad English, and numerous typographical errors which disfigure it.] **F. Angell.** 'Discrimination of Clangs for Different Intervals of Time.'—II. [(1) Experiments with distraction: distraction did not always distract; no one of the forms of distraction employed (addition of written figures, counting of metronome beats, reading letters of printed words backwards, reading interesting matter aloud) was decidedly better than the others; the observer's estimate of the depth and absorbing power of a given distraction is not trustworthy; there is, in most cases, no conscious comparison between the presented sensation and a memory-image of a past sensation. (2) The memory-image theory of discrimination. *Critique* of Lehmann; the 'fading' of tones in memory may mean either a rise or a fall in pitch. Criticism of Starke, Kämpfe, Bentley, Radoslawow, Warren and Shaw.] **W. C. Bagley.** 'The Apperception of the Spoken Sentence: a Problem in the Psychology of Language.' [(1) The perception of auditory symbols. (*a*) The influence of context upon the perception of auditory symbols. In monosyllabic words the elision of the initial consonant affects perception more than the elision of the final consonant. The position most favourable for the correct perception of a mutilated word is at the end of a complete sentence. (*b*) The relations of the symbolic elements to one another in auditory perception. The elision of mutes works the greatest injury to the perception of a mutilated word; the elision of the semivowels works the

least injury. (2) The conscious process involved in the apperception of spoken symbols. The principle of contextual supplementing. Apperception involves the presence in consciousness mainly of visual and verbal ideas ; the most complete form which the visual elements take is that of an ideal reproduction, more or less faithful, of a typical environment as represented by the context. "In general : the consciousness concomitant with the apperception of auditory symbols is made up of sensational and affective elements (some peripherally, some centrally aroused) in connexions which vary in character with different individuals and under different conditions. These connexions are arranged in patterns which change rapidly into one another, and are in general transitory and fleeting. When the attention is directed to the peripherally excited elements exclusively . . . the meaning which they as symbols should convey is not clearly apperceived. When the attention is directed upon the centrally aroused ideas which the symbols suggest, the 'meaning' is apperceived, but errors and lapses in the stimuli are apt to pass unnoticed."] **M. W. Calkins.** 'Minor Studies from the Psychological Laboratory of Wellesley College.'—IV. **G. A. Andrews.** 'Studies of the Dream Consciousness.'—II. [Attempts to secure dreams by suggestion before sleeping, and by application of stimuli during sleep. Statistics of 118 dreams of the author. One taste, two smell dreams. Double identity in dreaming.] **F. R. Barrell.** 'The Relation of Stimulus to Sensation : a Reply to Mr. Max Meyer's Criticism of Prof. C. L. Morgan's Paper.' Psychological Literature. Books Received.

International Journal of Ethics. Vol. xi., No. 3. **J. M. Robertson.** 'The Moral Problems of War.' [An answer to Prof. Ritchie's paper in the preceding number. War in general, and the present Boer War in particular, cannot be justified on the ground that conquest spreads civilisation. It certainly fosters immoral passions in the conquerors.] **B. Bosanquet.** 'The Meaning of Social Work.' [It consists in the effort to gain direct contact with the human nature of those around us. It is generally attempted without due training. Training is best got, not from political economy, which gives no instruction in human character, but in University Settlements and the like.] **C. G. Shaw.** 'The Theory of Value and its Place in the History of Ethics.' [The concept of value is the *unum necessarium* of ethics. It has been wanting both in ancient and modern philosophy. The introduction of the concept will result in improvement in psychology, ethics and metaphysics.] **Mary M. Patrick.** 'The Ethics of the Koran.' [It presents absolute justice as the standard of morality. It does not teach fatalism, though its precept of perfect submission to God is often misinterpreted thus. It favours a democratic order of society.] **H. Barker.** 'Factors in the Efficiency of Religious Belief.' [There are two heterogeneous factors, the moral and the supernatural. The latter loses its efficacy as soon as it is doubted, but it can be replaced by a presentation of faith as a reality in human life.] **J. G. Phelps Stokes.** 'On the Relation of Settlement Work to the Evils of Poverty.' [Poverty is due to defective personality. The aim of settlement work is to awaken the personality.] **G. Ferrero.** 'The Evolution of Luxury.' [Ancient luxury aimed at display; modern luxury at comfort. This seems to be due to greater materialisation; it is really due to moral improvement.] Discussions. Mr. Hayward's Evaluation of Prof. Sidgwick's Ethics, by **E. E. Constance Jones.** A reply, by **F. H. Hayward.** Book Reviews.

Revue de Métaphysique et de Morale. 8e année, No. 6. Novembre, 1900. **É. Boutroux.** 'La philosophie de Félix Ravaisson.' [An

obituary notice of the founder of the *Revue*, which, though wholly laudatory, does not convey a high idea of his philosophical achievements. In the course of a long life, M. Ravaisson appears to have published a few works on philosophical subjects, in which he expressed his conviction that 'the true philosophical method was that living reflexion, in which all our faculties, the heart along with the reason, feeling along with intelligence, take part'; that, since the mechanical activity of matter can only be 'explained' as 'habit,' *i.e.* as a degraded form of spiritual activity, spiritualism is true and the problem of philosophy will be solved if we can 'seize the very substance of the soul, in its truth and its plenitude'; that this substance consists in love, which is 'the need of union with a being better than us'; and that thus Christianity completes the spiritualism of Aristotle. M. Ravaisson also devoted his attention to art, and concluded that beauty consisted in the expression of love, especially of that self-sacrificing love which the Greeks did not know: art was therefore better than science, and religion best of all.] **W.-N. Kozlowski.** 'Les Propositions Fondamentales de la Science Moderne à l'Aube de la Philosophie Grecque.' [As 'fundamental propositions of modern science' M. Kozlowski enumerates ten principles, of the most heterogeneous character, including, along with the conservation of momentum and of energy, such assertions as the following: 'Matter . . . forms the substratum of all phenomena,' 'The universe is constantly in a state of transformation in one direction, or *evolution*,' 'Matter is not continuous,' 'The qualities which we perceive by our senses . . . do not belong to bodies but are produced in our consciousness'. He reviews the tenets of the pre-Socratic philosophers, in order to show that all these principles, except the conservation of energy, 'were *precisely* expressed by the Greeks'—Leucippus having completed the catalogue. Even the conservation of energy, which he now identifies with that of momentum, 'was tacitly admitted in Leucippus's conception of eternal movement'. Yet 'the idea of forces acting at a distance . . . a conception without which atomism could never advance beyond *vague* generalities . . . appears to be entirely unknown to the ancients'. M. Kozlowski maintains that these principles 'are not results, but necessary postulates of science'; whereby he appears to mean partly that induction cannot prove them, partly that their discovery must precede induction, partly that 'they do not express real relations' but 'were imposed on nature by human thought'. He admits, however, that he has not space to prove the last point.] **Ch. Riquier.** 'De la Distinction entre les Sciences Déductives et les Sciences Expérimentales.' [The author's object is 'to establish between the Sciences a distinction founded exclusively on *positive* considerations'—a term which he explains only as meaning non-metaphysical. He defines 'deductive' as meaning 'any Science which in its logical development encounters no contradictions,' and 'experimental' as meaning 'not-deductive,' and he undertakes to prove that the only deductive sciences are those 'which may be logically reduced to the arithmetical notion of integral number'. The deductive Sciences, including Geometries 'independent of spatial intuition,' he subsumes under the name Mathematics, and his only argument to prove that these are deductive is that 'the notion of integral number . . . is so perfectly precise . . . that it cannot lead to contradictions'. With regard to all other Sciences, he assumes that they all must imply a Geometry 'founded on the sense-intuition of space'; and he has therefore only to prove that such a Geometry leads to contradictions. His proof consists in asserting that any 'intuitive' straight line can be divided into a number of parts which are 'minima of perceptible ex-

tension,' and that it follows from this that 'Two straight lines always have a common measure'—an assertion which he easily shows to contradict the 'theorem of Pythagoras': but he does not inform us whether this theorem is, as seems to be essential to his point, itself based on intuition.] **E. Chartier.** 'Le problème de la perception.' [The author pretends to prove that nothing is 'given' in perception except 'the fixed order of an indefinite diversity of possible sensations'; everything else is 'acquired'—a term which he identifies with 'added to things by thought'. He sets out by declaring that nothing with regard to which we can be mistaken is 'given'; for 'if it were given, it would be real by definition'. This might have seemed sufficient by itself to prove that nothing is 'given': but our author will not be content till he has shown in detail that 'distance' *cannot* be 'given' to any of the senses, and that 'sensations' also *must* be 'acquired'. His arguments are of the most heterogeneous nature; and even where they prove that something is 'acquired' he invariably fails to distinguish both what it is they prove to be so, and in what sense it is 'acquired'.] Critical Study. Proceedings of Congresses, New Books, etc. 9e année, No. 1. Janvier, 1901. **F. Ravaisson.** 'Testament philosophique.' [The last notes of M. Ravaisson, put together in a connected form by the editor. According as men are inspired by kindness and sympathy, like the Greek heroes, or by egoism, there have always been two different ways of understanding things, mechanical atomism and spiritualism. There follows a brief account of Greek philosophy, in which Plato is blamed for making realities of abstractions, while Aristotle recognises that nature is 'an edifice of thoughts,' and that the best is the first. The best, which is one, gives rise to the others, which are many and its parts, out of spontaneous condescension. This principle is illustrated by animal life: there are no such things as reflex actions; everything is designed by a mind aiming at perfection. Man, the most perfect, being the goal, must also have been the beginning. "How? We don't know and perhaps we never shall." There follows a number of imaginative remarks on art. But the art of life is the highest of all, and its secret, which the Stoics and Kant could not perceive, is love. Love being the principle of the universe, it is impossible that sinners should be condemned for ever, though they may be for a long time. Such is 'the heroic philosophy' which 'does not construct the world with mathematical and logical units'.] **H. Bouasse.** 'De l'éducation scientifique des "philosophes".' [A protest, by a Professor of Physics, against the official programme for the teaching of philosophy in France. M. Bouasse complains that, while the candidates are expected to be able to classify and to understand the methods of the sciences, they are only enabled to learn by rote formulæ, many of which are false, antiquated, or meaningless, and which, in any case, they have not sufficient knowledge to understand. They are forced to study the worthless speculations of men of science or philosophers (*e.g.*, Mill's *Logic*) about scientific method, instead of being supplied with examples of its successful application. M. Bouasse would not have them learn even so much of the experimental sciences as is now imposed on them: he would only give them the indispensable tool for learning them, namely, a thorough, though elementary, knowledge of mathematics. He sketches the parts of mathematics, which would be sufficient and necessary for this purpose; and ventures the questionable assertion that, if some students were unable to learn them, it would be so much the better: for 'all philosophers worthy of the name, would have got on very well with mathematics'. He points out that mathematics is not a special science, but an enlarge-

ment of logic.] **L. Brunschvicg.** 'De la méthode dans la philosophie de l'esprit.' [A reply to M. Cantecor's critique, in the last number, of the author's *Introduction à la Vie de l'Esprit*. 'Critical idealism' does not, by accepting Kant's 'denial of being,' involve, as M. Cantecor thought, the denial of spiritual reality: it affirms 'being,' but maintains that it consists in spontaneously active thought, and can therefore never be a mere object of thought, which would reduce it to an 'inert substance'. Nor is its method, which aims at 'identifying' what it studies with 'logical reflexion,' therefore 'psychological': for the psychological method puts all judgments on a level, regarding them all as attesting only the existence of a single individual at a single moment, whereas M. Brunschvicg's 'method of identification' distinguishes them according to their fitness to form a system, regarding those which are most fit and most universal as the truer; this is the 'law of unity'—something generated by reflexion within the individual, but which is not limited to the individual. If, however, this 'law' or 'unity' be conceived spinozistically as 'infinite,' it becomes incompatible with individuality, as we know it, and therefore cannot be conceived as real: the only true object of religion lies in the spirit's own 'autonomous power, which is the principle of truth and the foundation of good, and beyond which there is nothing;' hence, the triumph of justice does not depend upon the course of nature, which is merely 'a provisional abstraction'.] Critical Studies. Practical Questions. New Books, etc.

Zeitschrift für Psychologie und Physiologie der Sinnesorgane. Bd. xxv., Heft 4. **J. von Kries.** 'Ueber die Abhängigkeit der Dämmerungswerthe vom Adaptationsgrade.' [The twilight value of a coloured light is the brightness value which attaches to the light when it is seen with the dark-adapted eye, and at such a low intensity that it appears colourless. According to Von Kries, it is the stimulation-value of the dark apparatus of the eye, *i.e.*, of the purple-containing rods; according to Hering and Hillebrand, it is the white value of the light in question. The author finds that the twilight value changes with increasing adaptation, not very considerably but still clearly, and, in a sense, opposed to the Purkinje phenomenon.] **J. von Kries.** 'Ueber die Wirkung kurzdauernder Reize auf das Sehorgan.' [Reply to (and criticism of) Hess' paper in the *Arch. f. Ophthalmologie*.] Literaturbericht. Bd. xxv., Heft 5, 6. 'Bibliographie der psycho-physiologischen Literatur des Jahres, 1899,' zusammengestellt von **L. Hirschlaff.** [Issued May, 1901, 4,045 titles, as against the 2,746 of the corresponding list for 1898, and 2,584 of the *Psychological Review* list (published March, 1900) for 1899.] Bd. xxvi., Heft 1, 2. **A. Mayer** und **J. Orth.** 'Zur qualitativen Untersuchung der Association.' [An attempt to substitute a psychological for a logical classification of associations between spoken words. Two lines of division are suggested. The associations fall, on the one hand, into (1) those without, and (2) those with interpolated conscious processes: the latter group may be further subdivided, according to the kind, number and feeling-tone of the interpolations. They fall, again, into (1) those without concomitant conscious processes, (2) those in which the stimulus-word is attended by such processes, (3) those in which the reaction-word is thus attended, and (4) those in which both words have conscious concomitants.] **W. von Tschisch.** 'Der Schmerz.' [A paper written rather from the medical than from the psychological standpoint, whose author is apparently unfamiliar with the recent psychophysical literature of pain. "Stimuli which are harmful to the individual excite unpleasant feelings; stimuli which kill the individual also excite unpleasant feelings; stimuli which kill living tissue

excite pain." Pain consists always of feeling and sensation ; but "the more intensive the feeling—the pain—the more obscure is the corresponding sensation ". The essay ends with general remarks on the attributes, memory value and educative value of pain. No attempt is made at an introspective discrimination of the pains peculiar to the various pain-giving tissues.] **A. Brueckner.** 'Die Raumschwelle bei Simultanreizung.' [A careful investigation, made with Von Frey, by help of a new aesthesiometer (Von Frey) which allows of exactly simultaneous application of two points. If two pressure spots are subliminally stimulated at the same time, there is a fusion or summation of effect, and a single pressure sensation may be set up even at a distance of 130 to 140 mm. With increase of distance, the phenomenon of summation appears to be replaced by that of subtraction ; the double stimulus is less effective than the single. It is impossible to give a fixed value for the limen of separateness : a separation of the points that usually produce fusion may, under circumstances, produce two distinct sensations. All that can be done is carefully to work out the conditions, physiological and introspective, under which the different phenomena make their appearance.] **R. Hohenemser.** 'Zur Theorie der Tonbeziehungen.' [Stumpf's theory of fusion tells us nothing of the nature of consonance and dissonance ; gives no explanation of melody ; and, though it points to a fact, makes this fact ultimate, bringing it into connexion neither with physical uniformity nor with the mental life at large. Lipps' theory, of the unconscious rhythmical effect of tonal stimuli, covers the ground satisfactorily. The writer expounds this theory at length, and seeks to meet Stumpf's two objections : (1) that neither the physical nor the physiological discontinuity of the processes which excite tonal sensation is obvious *a priori*, and (2) that there is nothing convincing in the presupposition that the unconscious rhythm exerts a pleasing effect upon us. He then seeks to explain by the rhythm theory the facts of extension of intervals beyond the octave, and of inversion of intervals. By a flexible use of the 'unit' of rhythm, he reaches the conclusion that " 1 : 2 corresponds to the octave, 1 : 3 to fifth and fourth, 1 : 5 to major third and minor sixth, 3 : 5 to major sixth and minor third, 1 : 9 to major second (the major whole tone) and minor seventh, 5 : 9 to the group of intervals of the minor whole tone, 1 : 15 to the major seventh and minor second. In this whole series the degree of consonance progressively diminishes '.] **E. Storch.** 'Eine letzte Bemerkung zu Herrn Edinger's Aufsatz " Hirnanatomie und Psychologie ".' Literaturbericht. Bd. xxvi., Heft 3, 4. **K. Groos.** 'Experimentelle Beitraege zur Psychologie des Erkennens.—I. Die Arten der Denkbeziehung beim Fragen.' [The author attempts to bring the psychology of cognition under experimental control. He reads to his class a number of sentences, with the object of arousing the questioning attitude in his hearers' minds. The questions that arise are written down, and classified by categories. The general psychology of the questioning attitude has three phases : (1) a balk ; a quick turn of the attention, accompanied by the wish or expectation of some logical relation ; (2) the requirement of a special kind of logical relation, the turning of consciousness to one or another logical form, without there being as yet any concrete filling to the form ('empty' questioning) ; and (3) the uncertain cropping-up of this filling, the stage of conjecture, of yes or no consciousness (questioning with germ of judgment). The author has collected in all 479 questions, which include 538 logical relations. These are tabulated under the headings spatial, temporal, number, comparison and discrimination, substantial, causal and existential. The results are too detailed for quotation ; we

note the psychological primacy of direction, under the spatial relations; the great preponderance of the causal relation over all others, etc. A second paper is to deal with the formation of new judgments.] **E. Wiersma.** 'Untersuchungen über die sogenannten Aufmerksamkeitsschwankungen.'—I. [Careful experiments with light, sound and pressure. Results: a more or less regular, approximately proportional increase of the times of noticeability with the magnitude of the stimulus differences; a more or less regular shortening of the periods of fluctuation, as the stimulus differences are increased; great individual differences as regards (1) the reciprocal effects of practice and fatigue during a single experiment, and (2) their reciprocal effects upon later experiments of the same day. From the last two facts the author concludes that the fluctuations are, at least in large measure, referable to central conditions. Future papers are to deal with the fluctuations of attention in normal persons, when influenced by drugs, etc., and in the mentally unsound.] **E. Storch.** 'Ueber die mechanischen Correlate von Raum und Zeit, mit kritischen Betrachtungen über die E. Hering'sche Theorie vom Ortsinne der Netzhaut. Auf Grund eines Falles von monocularem Doppeltsehen ohne physikalische Ursache.' [In a case described by Bielschowski (*Arch. f. Ophthalm.*, 1897), and later tested by Hering, each retinal element has two space values. This change of perception corresponds to no discoverable change of the retina, but rather to a change in the motor apparatus. The space value of the macula is single, but not normal. It follows that visual space values in general are functions, not of the rods and cones, but of the eye-muscles; Hering's 'light sensation' must be split up into an elementary light sensation (corresponding to retinal excitation), and a very closely associated space perception, the 'psychical representation' of the eye-muscles. As this analysis is actually realised in the pathological case before us, we must assume the existence of separate apperception apparatus for space and light.] **J. Pikler.** 'Eine Consequenz aus der Lehre vom psychophysischen Parallelismus.' [From Storch's statement that "matter possesses a memory" (*Zeits.*, xxiv., 192), the author makes the following deduction: "The most diverse successive conscious states (*e.g.*, sensations of different senses) of the same individual have their physical correlate in further changes of the same movements (or changes of movements) that were the physical correlates of the previous conscious states and whose residues are the correlates of the memory of these conscious states. To the unitary course of consciousness in the same individual there correspond not successive changes at different parts of the central nervous mass, but changes in changes at the same parts."] **F. Kiesow.** 'Besprechung und Entgegnung.' [Review of Alrutz' *Studien auf dem Gebiete der Temperatursinne.*—II. *Die Hitzeempfindung.*] Literaturbericht.

PHILOSOPHISCHE STUDIEN. Bd. xvii., Heft 1. **R. Mueller.** 'Ueber Mosso's Ergographen, mit Rücksicht auf seine physiologischen und psychologischen Anwendungen.' [The ergograph was employed in experiments upon the question: whether and in what way the rhythmisation of metronome strokes exerts a certainly ascertainable influence upon amount of muscular work, and how these processes show themselves to introspection. It was found, however, that the instrument cannot be taken for granted; and the present paper is devoted to its criticism. In the first place, it puts in operation, not a single muscle, or a small and sharply limited group of muscles, but a large number. What, then, has one got with the curve of fatigue? (*a*) The curves of health and disease are different; (*b*) certain types of fatigue may be differentiated; (*c*) the effects of alcohol, sugar, narcotics, may be followed; and (*d*)

certain gross phenomena of muscle physiology (amount of work and its distribution) are interpretable by the expert. Where, now, does the fatigued organ lie—at the periphery (muscle or muscular nerve-ending) or at the centre? We must know what the effects of purely muscular fatigue are, and then prove that the ergogram is not explicable in terms of them. The fatigue-curve of a single muscle is known. But we have in the ergogram the curve traced by the co-operation of many muscles: here, then, is a source of difficulty at the outset. Mosso concluded that there is no 'typical' curve of ergographic fatigue. Hence the hypothesis that central factors play a part in the curve is merely an hypothesis, more or less plausible simply as it is more or less vague. It is an hypothesis, *e.g.*, even to say that the course of central fatigue is in general similar or parallel to the course of muscular fatigue. The instrument is, therefore, at present at least, useful only for investigations of muscle physiology. It would, however, be worth while to introspect the sensations accompanying ergographic fatigue. We might then raise the questions: what relation do the fatigue sensations of muscular fatigue bear to other kinds of fatigue-process, such as fatigue induced by intellectual activity? and what is the relation of the complex of sensational and volitional processes which we call 'exertion' to the components of the fatigue complex (fatigue sensations)? Are these themselves intensified innervation sensations, or conditioned from the periphery?] **G. Cordes.** 'Experimentelle Untersuchungen über Associationen.' [Introspective characterisation of the process of immediate association, and experimental search for mediate associations in Scripture's sense. (1) The first term in a word-association need not be the stimulus-word itself. It may be, in which case the word and its meaning come to consciousness together. But it may also be the visual form of a portion of the word, or an æsthetic feeling set up by this form; or the word-idea, visual, auditory, etc., set up by the process of reading. Where the stimulus is a nonsense-syllable, it may be immediately completed to a known word, without consciousness or misreading. Again, the starting-point of association may be a feeling; or the stimulus may be interpreted as a command, in which case also feelings begin the associative series. (2) The second term (the first 'associated') may be a word: *e.g.*, clang associations. It may be a pictorial idea, of memory or imagination. There may be a double association, of picture to stimulus and also of word (not to picture but) to stimulus. If the stimulus is interpreted as command, there may be an arrest of association: movements are often made, but without idea of movement. The meaning of the word may act as suggestion to a present faint sensation, raising it to abnormal intensity. Lastly, the first associated may be a complex of multifarious processes, a 'concept sphere' before which the introspection of the observer is powerless. This double analysis shows how far from the truth is the customary clear-cut description of the word-association. (3) The mental connexion between the first and second terms may be summarised as follows. "As the first term of the association is set up by the addition of reproductive elements to the sense-elements aroused by the stimulus, so does the second term (the associated) arise by the accession of new reproductive elements to a persistent constituent of the first term." (4) Experiments on mediate association. The method of double series (one word-series of connected words, and a second of random or nonsense words) gave no results. The method of paired stimuli, each with identical secondary stimulus, gave a few cases. The most fertile method was that of alternate series of words and nonsense syllables, which the observer learned by heart; some days later the

nonsense syllables were employed as stimulus-words. Mediate association is not frequent, but, under favourable conditions, does occur.] **G. F. Lipps.** 'Die Theorie der Collectivgegenstände.' [A theory of collective objects, based upon the work of Fechner and Pearson. The methods of these investigators are a great improvement upon those of Quetelet, but still show defects, which cannot be remedied by Bruns' procedure. The author bases his discussion chiefly upon the original form of Bernoulli's theorem, and upon Gauss' principle of average error.]

Vierteljahrsschrift für Wissenschaftliche Philosophie. Jahrg. xxv. Heft 1. **A. Dünges.** 'Das Problem des Todes.' [Chemical and biological account of death are inadequate, because chemistry and biology can give no satisfactory account of individuality. Death occurs when the unity of a psychical individual is destroyed.] **J. W. A. Hickson.** 'Der Kausalbegriff in der Neueren Philosophie.' [Deals with Brown, J. S. Mill and Kant. Mill fails either to give clear formulation to the concept of causality or to justify its validity. Kant differs from Hume in insisting that the relation of cause and effect is an analogue of that of reason and consequence, and not mere *de facto* constancy or sequence. But he fails to show how this is so.] **P. Barth.** 'Fragen der Geschichtswissenschaft.'—III. [Deals with H. S. Chamberlain's book, *Die Grundlagen des Neunzehnted Jahrhunderts.*] Heft 2. **J. W. A. Hickson.** 'Der Kausalbegriff in der neueren Philosophie.' [Criticism of Schopenhauer.] **A. Dünges.** 'Das Problem des Todes.' [Artificial and natural death. The origin of death. The ethics of death.] **O. Külpe.** 'Zu Gustav Theodor Fechner's Gedächtnis.'

Archiv für Systematische Philosophie. Neue Folge. Bd. vii. Heft 1. **W. Schuppe.** 'Zum Psychologismus und Zum Normcharacter der Logik.' [Logic may have consciousness as its subject matter without being in any sense based on psychology. For what logic deals with is "consciousness in general," *i.e.*, with those contents which belong to consciousness just because it is consciousness at all. But psychology is concerned with the *individual* consciousness as such.] **J. Bergmann.** 'Die Grundsätze des reiner Verstandes.' [A category is a concept which is explicitly contained in the concept of a possible object of a true judgment. Principles of the pure understanding are only implicitly contained in this concept. They are in fact identical with, but for our apprehension distinct from, its explicit content. The article contains some acute criticism of Kant. **L. Goldschmidt.** 'Kant's Widerlegung des Idealismus.' [Defends Kant's position against the charge of inconsistency brought by Vaihinger.] **A. Müller.** 'Haupt probleme der Metaphysik bei Lotze.' [A clear and comprehensive exposition.]

Pflüger's Archiv f. d. gesammte Physiologie. Bd. lxxiii., Heft 11 und 12. **T. Beer.** 'Die Accommodation des Auges bei den Amphibien.' Bd. lxxiv., Heft 1 und 2. **V. Hensen.** 'Wie steht es mit der Statocysten-Hypothese?' **V. Urbantschitsch.** 'Uber den Einfluss von Schallempfindungen auf die Schrift.' Heft 7 und 8. **T. Beer.** 'Vergleichendphysiologische Studien zur Statocystenfunction, ii., Crustaceen.' Heft 9 und 10. **A. Rollett.** 'Beitrage zur Physiologie des Geruchs, des Geschmacks, der Hautsinne, und der Sinne im Allgemeinen.' Heft 11 und 12. **E. Paulsen.** 'Untersuchungen über die Tonhöhe der Sprache.' **H. Griesbach.** 'Vergleichende Untersuchungen über die Sinnesschärfe Blinder und Sehender.'—I. Bd. lxxv., Heft 6 und 7. **A. Schwendt.** 'Experimentelle Bestimmungen der Wellenlänge und Schwingungszahl höchster hörbarer Tone, mit Benutzung von Herrn Dr. Koenig brieflich mitgetheilter praktischer Anleitungen.' Heft 8, 9 und 10. **H. Griesbach.**

'Vergleichende Untersuchungen,' etc.—II. **Guillery.** 'Messende Untersuchungen über den Formensinn.' Heft 11 und 12. **H. Griesbach.** 'Vergleichende Untersuchungen,' etc.—III. Bd. lxxvi., Heft 2, 3 und 4. **J. R. Ewald.** 'Eine neue Hörtheorie.' **A. Schwendt.** 'Ergänzung zu meiner Abhandlung "Experimentelle Bestimmungen,"' etc. Heft 11 und 12. **W. Larionow.** 'Ueber die musikalischen Centren des Gehirns.' **A. Beck.** 'Ueber künstlich hervorgerufene Farbenblindheit.' Bd. lxxvii., Heft 1 und 2. **F. Schenck.** 'Ueber intermittirende Netzhautreizung.'—VIII. **A. Walther.** 'Beobachtungen über den Verlauf centraler und extramacularer negativer Nachbilder.' Heft 5 und 6. **J. Laudenbach.** 'Zur Otolithenfrage.' Bd. lxxviii., Heft 1 und 2. **A. Samojloff.** 'Zur Vocalfrage.'—I., II. **L. Hermann.** 'Die optische Projektion der Netzhautmeridiane auf einer zur Primärlage der Gesichtslinie senkrechten Ebene.' Heft 7 und 8. **M. Meyer.** 'Zur Theorie des Hörens.' **O. Zoth.** 'Ueber den Einfluss der Blickrichtung auf die scheinbare Grösse der Gestirne und die scheinbare Form des Himmelsgewölbes.' Heft 9 und 10. **K. L. Schaefer.** 'Eine neue Erklärung der subjectiven Combinationstone auf Grund der Helmholtz'schen Resonanzhypothese.' Bd. lxxix., Heft 1 und 2. **A. Bethe.** 'Noch einmal über die psychischen Qualitäten der Ameisen.' Heft 5 und 6. **E. von Cyon.** 'Ohrlabyrinth, Raumsinn und Orientirung.' **A. Rollett.** 'Die Localisation psychischer Vorgänge im Gehirne.' Heft 9 und 10. **E. ter Kuile.** 'Die richtige Bewegungsform der Membrana basilaris.' Bd. lxxx., Heft 1 und 2. **F. B. Hofmann** and **A. Bielschowsky.** 'Ueber die der Willkür entzogenen Fusionsbewegungen der Augen.' Heft 11 und 12. **E Raehlmann.** 'Einige neue Resultate bei der Untersuchung relativer Farbenblinder.' Bd. lxxxi. **M. Meyer.** 'K. L. Schaefer's "Neue Erklärung der subjectiven Combinationstöne".' **M. Meyer.** 'E. ter Kuile's Theorie des Hörens.' Heft 6 und 7. **A. Tschermak.** 'Beitrag zur Lehre vom Längshoropter.' Heft 8, 9 und 10. **W. Straub.** 'Ein neues Kymographion.' **R. Dreyfuss.** 'Experimenteller Beitrag zur Lehre von den nicht-akustischen Funktionen des Ohrlabyrinths.'

PHILOSOPHISCHES JAHRBUCH. Bd. xiv., Heft 1. **F. v. Hertling.** 'Christenthum und griechische Philosophie.' [This paper is devoted to the influence which Greek philosophy exerted on the evolution of Christianity. Within the Church it afforded proper expressions to clothe the new belief, arguments to uphold the fundamental dogmas, and precise formulas to express its mysteries. Without the Church it produced the many Gnostic sects.] **L. Schütz.** 'Naturkraft und Seelenvermögen.' [Where activity is there is a principle of activity, a *principium quod* and a *principium quo*. Only the latter is force in Nature, and faculty in living beings. Force is simply active; faculty, being directed towards the being that has it, is at once active and passive.] **E. L. Fischer.** 'Das Relativitäts princip,' etc. [The writer, starting from the principle that whatever systems of philosophy deal with the Relative or the Finite, must be false if they deal with them absolutely, points out the falsehood of Realism and Idealism, Empiricism and Apriorism, Dualism and Monism, Pessimism and Optimism, etc.] **A. M. Steil.** 'Ueber die Thätigkeit der vom Leibe getrennten menschlichen Seele.' [This is a long and highly important paper. The author is of those Scholastics who believe that the immateriality of the soul by no means proves it capable of thinking, when separated from the body, unless by a special influx of thought-power directly proceeding from God. He attempts to fortify his argument by the authority of St. Thomas.] **C. Gutberlet.** 'Teleologie und Causalität.' [In this second paper the writer proceeds to show that, order existing in the world, the chances

that there is an intelligent cause of that order are so great that no one intelligent could deny it. If there are laws, what makes matter obey them? To suppose each atom intelligent would not solve the question, since each would be so only to a very low degree, insufficient to account for universal order.]

VIII.—NOTE.

MIND ASSOCIATION.

THE following gentlemen have joined the Association since the printing of last number:—

FREMANTLE (Prof. H. E. S.), South African College, Cape Town.
Ross (W. D.), Merton College, Oxford.

Those who wish to join the Association should communicate with the Hon. Secretary, Mr. HENRY STURT, 5 Park Terrace, Oxford; or with the Hon. Treasurer, Mr. F. C. S. SCHILLER, Corpus Christi College, Oxford, to whom subscriptions should be paid.

Members resident in U.S.A. may, if they choose, pay their subscription ($5) into the account of the Treasurer (Mr. F. C. S. Schiller), at the Fifth Avenue Bank, corner of 44th Street, New York, U.S.A.

The Annual General Meeting of the Association will be held in the Old Common Room, Balliol College, Oxford, on Saturday, 2nd November, at 4 P.M.

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